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VOL. XXXI ST. LOUIS, NOVEMBER, 1921 No. 11

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
that they are contributed exclusively to THE LARYNGOSCOPE.)

**THE EFFICIENCY OF SOME ARTIFICIAL AIDS TO
HEARING*.**

DR. PAUL E. SABINE, Geneva, Ill.

The eye, regarded simply as a physical instrument, has been the object of a great deal of careful scientific study. Most of its defects are perfectly well understood, are capable of precise measurement and of exact remedy. From the standpoint of the physicist, there are few unsolved problems in physiological optics. Quite on the contrary, the ear, regarded as a piece of physical apparatus, presents many unsolved difficulties. Added to the barriers to complete knowledge of the ultimate anatomy of the ear, offered by its enclosure in the skull wall, there has been a serious neglect of the study of the physical aspects of sound upon the part of the physicist. This neglect has been in part due to the far greater attractiveness of other fields of physical research, notably those of light and electricity, and also in part to the intrinsic difficulties of exact acoustical measurement. Illustrating this latter is the fact that up to the present there has not been developed an instrument capable of measuring the intensity of sound apart from its pitch. The readings of all instruments designed for the measurement of sound intensity are affected by both variations of pitch and intensity. Even the nature of the most common sounds, namely, the sounds of the vowels, has for a long time been the subject of considerable difference of enlightened opinion.

*The experiments here recorded have grown out of the Research program in the field of Architectural Acoustics now being carried on in the Wallace Clement Sabine Laboratory, at Riverbank, Geneva, Illinois.

Measurements of the relative response of the ear to tones of different pitch have varied by factors of more than a thousand. Physicists have contributed relatively little in the way of exact knowledge to the problems of the otologists.

The results of the experiments here given are presented with the hope that they may serve as a starting point for a more extended



Figure 1.

application of physical methods to the study of otological problems, rather than with the thought of adding to the knowledge that otologist doubtless possess of the general inadequacy of the present so-called aids to hearing. The method employed is that developed by the late Professor Wallace C. Sabine and applied by him with eminent success to the study of auditorium acoustics. The successful

application of the method to the particular problem in hand is due to the thoroughly scientific spirit in which the observations were made by Mrs. M. H. Liddell of Lafayette, Indiana, who very generously devoted a great deal of time to the matter.* Without giving the details, the method is essentially as follows:

Sound from organ pipes is produced in a large empty room with highly reflecting walls. This room we shall call the Sound Chamber. This sound persists for a considerable length of time after the source of sound has ceased. The period during which this residual sound is audible will depend upon, (a) the power of the source of sound; (b) the total absorbing power for sound of the room, and its furnishings, including the clothing of the persons in the room, and (c) the acuity of hearing of the observer. This period we shall call the Period of Reverberation.

All the factors which determine the Period of Reverberation depend upon the pitch of the sound. The amplifications produced by the various ear trumpets employed also vary with the pitch of the sound so that a complete test would cover a large number of tones of the ordinary musical scale. Except for special reasons which will be noted later, the tests here recorded were confined to tones one octave apart over the frequency range from 128 to 4096 double vibrations per second. The tones with wave lengths and frequencies are given in the accompanying table.

| Tone | Frequency | Wave length (meters) | (Feet) |
|----------------|-----------|----------------------|--------|
| C ₂ | 128 | 2.664 | 8.75 |
| C ₃ | 256 | 1.332 | 4.37 |
| C ₄ | 512 | .676 | 2.18 |
| C ₅ | 1024 | .339 | 1.09 |
| C ₆ | 2048 | .169 | .54 |
| C ₇ | 4096 | .084 | .27 |

In making the observations, the observer was seated at a given position in the sound chamber. This position was kept constant throughout the series of tests. The precaution is necessary, since it is well known that the intensity of sound from a steady source within a closed room varies tremendously from point to point. By means of a special device, including electrical contacts for starting and stopping the organ pipes, and a chronometer for timing with precision, the periods of reverberation with and without the particular instrument being tested, were determined. The instrument

*The diagnosis given by Dr. J. Gordon Wilson was "Fixation of the Stapes, With No Involvement of the Internal Ear." It is a pleasure to acknowledge my indebtedness to Dr. Wilson for his interest in these experiments and helpful suggestions as to the presentation of the results.

was held to the observers right ear. It was found unnecessary to close artificially the left ear since in general the acuity of hearing with the latter was sufficiently less than the other to make this precaution unnecessary. In each test the observations for each tone were made alternately with and without the instrument held to the ear in order to allow for the error that might arise from fatigue. In every case the results given are computed from the mean of at least fifteen observations, and in most cases the number of observations was increased to twenty-five.

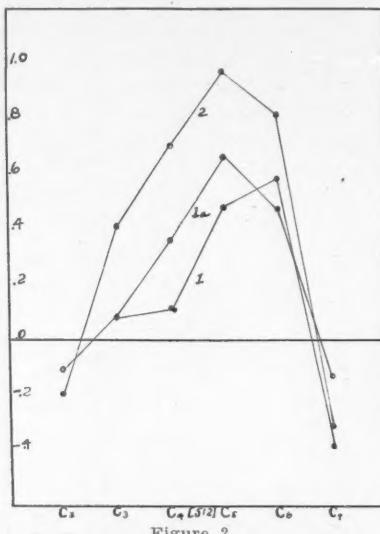


Figure 2.

REPRESENTATION OF RESULTS.

The measure of the efficiency of an artificial aid to hearing may be defined in a number of different ways. The numerical values obtained for this quantity will, of course, depend upon this definition. Let us suppose it possible to measure the amplitudes of vibration of the air particles adjacent to the tympanum with and without the trumpet. The squares of these amplitudes for a single tone would measure the relative intensities of the energy flux that produces the sensation of hearing, and the values of the ratio of these squares for the various instruments employed would be a basis for comparison of their relative merits as sound amplifiers.

If the correctness of the Weber-Fechner Law of Sensation, namely, that the actual increment of intensity necessary to produce the

minimum perceptible increment of sensation, is proportional to the intensity itself, then the logarithm of the squares of the ratios referred to above will measure the increase in the sensation of loudness of sound, produced by the various amplifiers employed. Now, without going into the details of the theoretical proof, it may be simply stated that the difference of the periods of reverberation as observed in the sound chamber with and without the artificial aid is proportional to the logarithm of the ratio of intensities of sound energy at the tympanum under these two conditions. In other words, the difference of times during which the residual sound may be

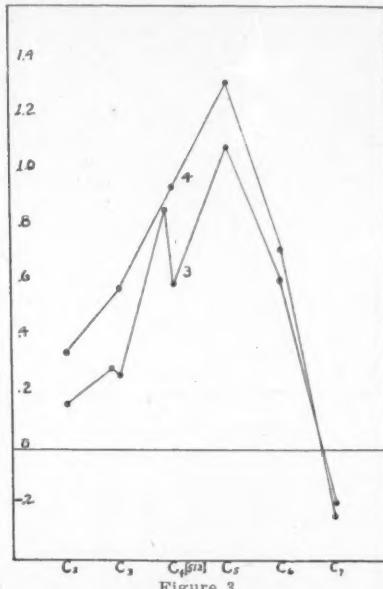


Figure 3.

heard with and without the instrument is a measure of the increase in loudness sensation produced by that instrument. In order to present the results most concisely, the graphical method usually employed in representing the results of physical measurements is employed. The various tones used are represented along the horizontal line. The distance above or below the horizontal line marked zero is the increase or decrease of the loudness produced by the particular instrument employed over the loudness as perceived by the unaided ear. For the sake of those interested in the physical aspects of these results, it may be stated that the values given on the vertical

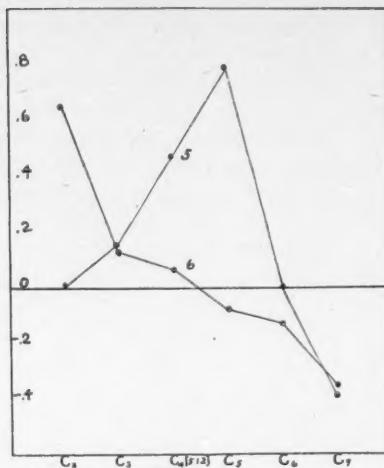


Figure 4.

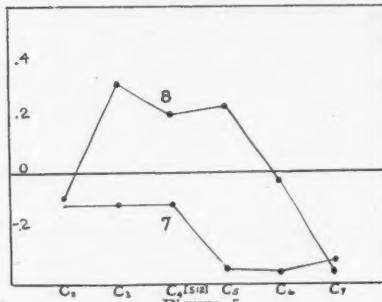


Figure 5.

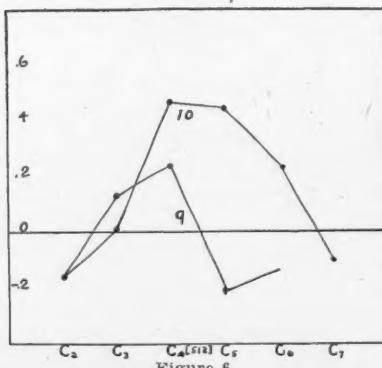


Figure 6.

scale are the logarithms to the base 10 of the ratio of intensity of the sound as heard with the instrument to the same sound heard by the unaided ear of this particular observer. Thus, a vertical distance of 1 on this scale represents an amplification of physical intensity by a factor of 10. A vertical distance of 2 represents an amplification of 100, 3 of 1000, and so on.

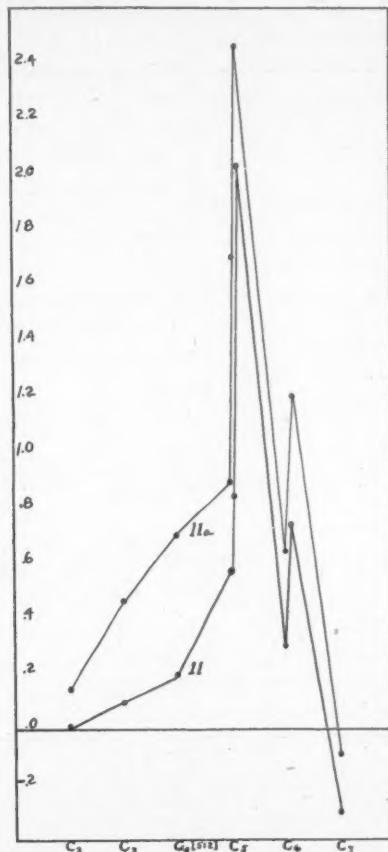


Figure 7.

VARIOUS TYPES OF INSTRUMENTS.

Eleven different instruments in all were tested. They were kindly loaned for the purpose by Messrs. Sharpe and Smith. With the exceptions of Nos. 7, 8, and 9, they are reproduced in Figure 1. For

the sake of comparison these may be divided into five different groups. These groups will comprise instruments of practically all the types now commonly in use.

Group (a) including Nos. 1, 2, 3 and 4. (Figure 1) may be called the open horn type of Ear Trumpet.

Group (b) is represented by Nos. 5 and 6. This type is a variant of group a, the passage in the open horn being partially obstructed at some point with a view to the possibility of "trapping" the sound.

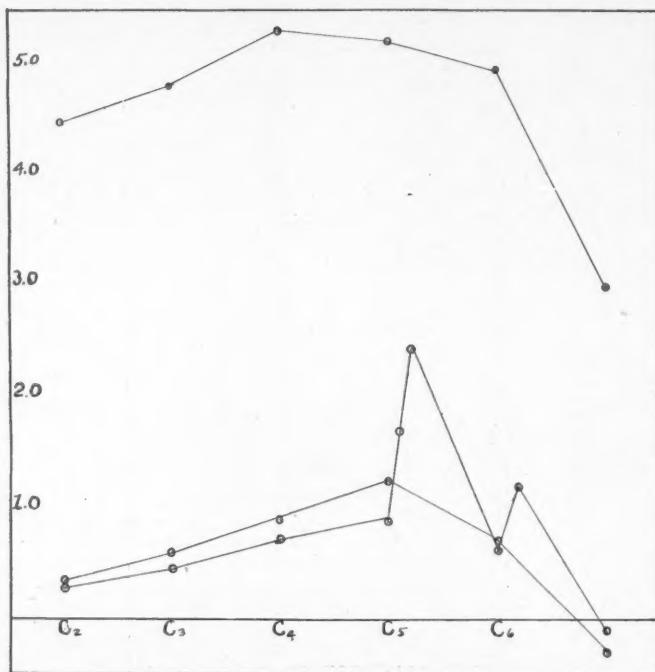


Figure 8.

Group (c) comprises various modifications of the speaking tube, and is represented by Nos. 7 and 8.

Group (d) includes instruments in which the attempt is made to transmit the vibration of solid bodies like diaphragms directly to the ear or by conduction through the bones of the skull. Nos. 9 and 10 are typical.

Group (e) represents the various telephonic devices that have been employed, of which No. 11 is typical.

Ear trumpets of group (a) are the oldest, and most commonly used device for the aid of the deaf. They are all more or less complicated modifications of the open conical horn. The underlying idea is that of a sound collector. The action upon sound is assumed to be that of a funnel which collects and introduces into the ear passage a greater proportion of the oncoming sound wave than does the external ear. It has been only recently that any quantitative experimental work has been done by physicists on the action of conical horns. The use of such instruments during the war in detecting and locating airplanes led to this quantitative study. The net result of this study is the conclusion that the action of a conical horn is more that of a sound resonator than of a sound collector, although both functions may be present. The body of the air enclosed by the sides of the horn, just as in the case of organ pipes, has its own natural pitch, and it responds to tones of this pitch much more vigorously than to others. Unlike the organ pipe, however, the horn is not a sharply tuned resonator, and has the power of amplifying a fairly wide range of tones higher in pitch than that of its own fundamental.

In Figures 2 and 3, the efficiency of trumpets of this type are represented. The numbers refer to the instruments as shown in Figure 1. They are described in the following table:

| No. | Material | Shape of Opening | Size of Opening | Length |
|-----|-------------|---------------------|--------------------|---------|
| 1 | Hard rubber | Circular | 6.5 cms. | 25 cms. |
| 2 | " " | " | 6.5 " | 35 " |
| 3 | " " | " | 9.5 " | 37 " |
| 4 | Light metal | Oval | 13 by 4 cms. | 41 " |

Examination of Figures 2 and 3 will bear out the following conclusions: First, the order of amplifications produced by these instruments is the same as that of their dimensions, indicating at once the limitation of the amplification to be expected from artificial aids of this type, namely, that imposed by the size of the instrument that can be conveniently carried and used. 1 and 2, similar in every particular save that of length, show the effect of that factor, the shifting of the maximum efficiency to the lower pitched tones as the length is increased. This is to be expected if we consider the action of the ear trumpet to be that of a resonator. The secondary maxima that appear in No. 3 occur at the natural frequencies of the inclosed air column, as determined by its response to a series of tuning forks held at the mouth of the instrument. It appears that with 1 and 2, the lowest tone was heard less loud with the instrument than with

out. This was confirmed by direct observation of the relative loudness as heard with and without these instruments. It may here be said that in every case in which a decrease in the time of reverberation was observed when using the instrument, the observer reported a fainter sound when the instrument was used than with the unaided ear. It is to be further noted that in every case, the highest tone was heard less loud with the instrument than without it, a statement which applies to all the various types of instruments tested. This suggests that for these high tones with their short wave lengths, the small cavity of the external ear acts as better resonator than do the air columns of the instruments.

The points of Figure 1 (a) represent the effect of the hand held to the ear. As a matter of practical interest it appears that the resonator thus formed is quite as effective as any of the various types of instruments tried excepting the largest of the horns and the telephone.

Turning to instruments of what may be called the "sound trap" type, we see less willingness of the sound to be "trapped" than to be "collected." Both 5 and 6 are of metal. No. 5 consists of two shallow cups, mouth to mouth, one inside the other, with an annular opening between. The inner one is joined to the tube leading to the ear. The sound enters the space between and is conducted to the ear. The diameter of the outer cup is 7 cms., and the length of the air passage is 23 cms. Its performance, as shown by 5, figure 4, is comparable with an open horn of about the same dimension. No. 6 was evidently designed for a parabolic reflector, with the opening of the tube leading to the ear placed at the focus of the reflecting surface. Its failure to function as expected is shown in curve No. 6, Figure 4, and serves as an excellent illustration of the point, that the ordinary laws of reflection do not hold for sound waves unless the reflecting surface is large in comparison with the wave length of the sound.

As an aid to hearing, the action of the speaking tube is virtually to bring the ear closer to the source of sound. The open end of the tube being held close to the mouth of the speaker, produces the same effect as would be produced by speaking at this same distance from the ear. The test as here conducted, of course, presents none of this effect. The amplifying effects alone of two types of speaking tubes are shown in Figure 5. No. 7 was a small flexible all metal tube with an internal diameter of .5 cms. and a cup-shaped mouthpiece 2.3 cms. in diameter. The points shown in No. 7 indicate that no ampli-

fication is produced by the tube itself, since they all lie below the line of the unaided hearing. No. 8 was a larger tube, about 2.5 cms. in diameter with a mouthpiece of 5 cms. in diameter. Here a slight amplification is shown by the tube itself.

No. 9 is a fan-shaped piece of thin hard rubber. It is held lightly against the teeth and the vibrations of the air are supposed to cause slight vibrations of the fan, and these vibrations are conducted through the bones of the skull directly to the auditory nerve. That this effect is present to a slight degree for the lower frequencies is shown by (curve 9) Figure 6. The observer reported a distinct sensation of sound as coming from the fan, and also expressed considerable uncertainty as to the timing of the period of reverberation due to the presence of two apparently distinct sources.

In No. 10, a light diaphragm of ebonite is placed at the bottom of a short conical tube. The vibration of the latter is transmitted to the air in the closed cavity formed when the instrument is held to the ear. The fundamental natural frequency of the diaphragm is considerably lower than any of the tones employed. Slightly greater pressure changes at the ear drum are produced by the use of the instrument as shown by the amplification noted in curve 10, Figure 6.

Figure 7 illustrates at the same time the merits and the defects inherent in all telephonic devices for the aid of defective hearing. Figure 11 gives the amplification produced by a set of microphone transmitter and magnetic receiver, with the current control set on the contact which the manufacturer recommends for "lecture and church use." 11(a) gives the performance of the same instrument when adjusted for "those who are very deaf." The sharp maxima occur at the natural frequencies of the diaphragm of the transmitter and of the receiver. This extreme response of tones of these frequencies results in the distortion of any combination of tones or of complex sound in which these tones may be present, as, for example, the vowel sounds.

This distortion, due to the selective response of the transmitter and receiver diaphragms is in part responsible for the difficulties in the telephonic transmission of speech sounds. A great deal of experimentation has been done on means of eliminating this defect of telephonic communication, but as yet, without complete success. The solution of the problem will mark a great improvement in aids of the telephone type.

Figure 8 indicates the extent to which the instruments tested fall short of supplying the necessary sound amplifications in this particular case of deafness. The two lower curves represent the amplifica-

tions produced by the largest of the trumpets, No. 4, and by the telephone set for maximum effectiveness. The points of the upper curve represent the amplification that would be necessary in order that the deaf ear might perceive sounds that are just audible to normal ears. This latter curve was computed from the duration of sound for a normal ear, under the conditions identical with those under which the tests were made. Recalling that vertical distances are the logarithms of physical intensities, it appears that the ear trumpet in the region of its maximum efficiency gives an amplification factor of about twenty, when the requirement is for one of nearly two hundred thousand. The telephone at maximum efficiency amplifies the physical intensity some three hundredfold, as compared with a desired amplification of more than one hundred thousand in this particular case.

Viewed in the light of our present attainments in artificial aids to hearing, the immediate prospects for the alleviation of extreme deafness by such means are not bright. However, recent developments in telephony, notably in the use of the thermionic vacuum tube as a means of amplifying telephonic currents afford considerable grounds for hope of securing the necessary increase of intensity. The problem of securing increased amplitude without increased distortion of the wave form is one that presents many physical difficulties. It is essential at the same time, to know the distortions of sound produced by the defects in the mechanism of hearing. It is obvious, therefore, that the general problem is one calling for highly specialized knowledge and skill in the fields of both otology and physics, and it is to be hoped that the very near future will see a combined attack upon the problem from both the physiological and physical sides.

THE COMPLETE SPHENO-ETHMOID OPERATION.*

DR. SIDNEY YANKAUER, New York City.

In a number of recent articles on the subject of ethmoid operations, as well as in private conversation, there appears to me to be some dissatisfaction with the eventual outcome of these procedures. This has not been my experience; on the contrary, it has always seemed to me that the spheno-ethmoid region was the easiest of all the paranasal spaces to rid of its inflammatory process. A review of the cases in my private practice shows that 80 per cent have been completely and permanently cured. By the word cured, I mean that the patient is entirely free from symptoms of any kind, subjective or objective; that he requires no treatment whatever, neither at home nor at the hands of the physician; and that this happy state of affairs has persisted for at least one year, and has continued to the present time. The oldest case is that of a man who for years had suffered from numerous large nasal polypi and nasal discharge, and who has been completely and continuously well during the past ten years.

These results seem to me to be most encouraging and as they can only be due to the principles which I have endeavored to follow, and to the manner of carrying out these principles, *i.e.*, to the technic employed, and as these differ in some respects from those described in the text books and other literature, I feel it incumbent on myself to present them for your consideration.

The principle of the first importance is that of the completeness of the operation. That is to say, whenever there is an indication to open even a single ethmoid cell, all the cells are opened at the first operation, from the infundibular cell to the sphenoid, from the supraorbital cells to the cells of the bulla and uncinate process. To open a single cell, or even a group of cells, without opening all of them, is a practice which I have entirely abandoned long ago. There are anatomical and clinical reasons for taking this standpoint. (1) The arrangement of the cells in particular groups is not anatomically constant. (2) In operating even on the cadaver, it is impossible to determine when all the anterior ethmoid cells have been entered without opening a single cell of the posterior group. In the living patient it is quite impossible to open the posterior ethmoid cells without removing some of the anterior cell walls. It is never possible to

*Read before the American Laryngological, Rhinological and Otological Society, June 3, 1921.

remove the entire anterior sphenoid wall without having first entered the posterior ethmoid cell. It is, therefore, anatomically impossible to be sure of having opened all of the cells of one group and at the same time to be sure of not having opened any of the cells of another group. (3) Clinically it is not possible to determine the exact number of cells involved in the suppuration even with the help of the most skillful radiographer. For I have repeatedly seen cases in which a single anterior ethmoid cell and a single posterior ethmoid cell were suppurating, while all of the intermediate and surrounding cells were entirely healthy. (4) It has been my clinical experience that whenever I have opened a single group of cells only, the rest of the spheno-ethmoid labyrinth had to be opened afterwards. For both the absorption of the pus to the mucous membrane and the capillary attraction in the narrow respiratory channels defy the laws of gravitation, and during the reaction from the traumatism the unopened cells have become infected. I can say truthfully that I have usually regretted having opened only a few cells, but that never in a single instance have I had any reason to regret having opened all of the cells at one sitting. In this respect the spheno-ethmoid region may be compared with the mastoid region. There was a time when otologists were satisfied to make a small trephine opening into the mastoid cortex, and leave the rest to take care of itself. Some of the patients recovered, but it soon became evident that to cure the largest number in the shortest time, only a complete operation would suffice, even if most of the cells were free from pus. I am neither the first nor the only one to advocate a complete operation, but partial and incomplete operations are still performed by many eminent rhinologists. It is my opinion that such operations are of no more benefit to the patient than an incomplete mastoid operation; that they should be abandoned entirely, and that no operation should be considered permissible which leaves a single cell in the entire spheno-ethmoid region unopened.

The second principle, not less important than the first, is the necessity of carefully preserving the mucous membrane lining the interior of the cells. For (1) we cannot too often remind ourselves that the mucous membrane of the nose is not merely the lining of a hole through which we breathe, but that it is an organ with a definite physiological function, with anatomical and histological parts distinctly differentiated for the purpose of exercising this function. When the mucous membrane has been removed from the entire spheno-ethmoid region, a surface of bare bone of considerable area is left which can heal only by granulation and epithelialization, the

end result, when it is finally accomplished, being a large irregular cicatrix covered with squamous epithelium, which exercises no function and which offers but little resistance to subsequent infection. The conservation of function is of special importance in the region under consideration for the middle meatus is the main respiratory channel, through which the greatest part of the inspiratory air passes. The demands made upon this region are greater than upon all the rest of the nose together. To remove the entire diseased organ may be one way of terminating the disease; but it is not the way to cure the patient.

(2) Even if the mucous membrane of the interior of the cells is diseased, is it *necessary* to remove it? When the cells have been freely opened the conditions for a return to normal are vastly improved. So frequently and with such regularity have I seen the greyish oedematous polypoid patches of mucous membrane return to a smooth pink healthy looking mucous, that I have come to regard such an outcome as the rule.

(3) The removal of the mucosa of the cell interior does not serve any really useful purpose; for if the object of removing it be to remove the infected mucous membrane, a most absurd blunder is being committed. For if the mucosa of the cell interior is infected, then surely the mucous membrane of the rest of the nose, for instance, that of the septum, which is continually bathed in the pus from the cells, must also be infected. Therefor only a part of the infected mucous membrane is removed by the operation. If it be argued that the nasal mucosa is able to throw off the infection because it is free and exposed, then the mucous membrane of the cell interior will also be able to throw off the infection, as soon as it also has become exposed by opening the cells.

(4) There is another excellent reason for leaving the mucous membrane of the cell interior in its place. The dura of the cranial cavity and the periosteum of the orbit are in direct continuity with this lining mucosa by means of blood vessels and nerves which pass through openings in the bony walls, some smaller and some larger. There are also occasionally dehiscences in the bone. When the mucous membrane is forcibly torn out, minute injuries are caused in these important structures, through which infection can travel with the greatest ease, not only at the time of operation, but during the entire course of the healing process. This danger seems to be entirely obviated when the mucous membrane is left in place; at any rate, in the cases which I have operated there have been neither intracranial nor orbital complications, and there have been no deaths.

(5) Finally the healing of the wound is enormously delayed by the removal of the mucous membrane. The site of the wound is always infected, and the bone does not granulate uniformly. The granulations easily become exuberant, and overlie the bare bone, so that it not infrequently happens that the convalescence is interrupted by the necessity of curetting fistulous tracts at the bottom of which bone is discovered, which was not found at the time of the original operation, because at that time the bone was healthy.

The situation is quite different when the mucous membrane has been left in place. Not only is the danger of complications reduced to a minimum, but as the area of bone which must granulate is only that represented by the edges of the partitions between the cells, this process is much more quickly completed and epithelialization takes place rapidly between the adjacent edges of the remaining mucosa over all parts of the wound. Secondary operative procedures are rarely needed, and the tendency of the larger cells to close until there is only a pin-point opening is entirely prevented. The mucous membrane itself, which at first is infantile in character, soon assumes the texture and consistency of adult mucous membrane, and begins to carry on its function, greatly to the well-being and comfort of the patient.

The operation consists of two parts, which are of equal importance. The first part is the operation itself, which is usually completed within an hour; the second part is the after treatment, which is divided into two periods. The first period is the time taken for the wound to heal; this is usually completed in about six weeks. The second period is the time required for the complete restoration of the function of the nasal mucosa; this takes at least one year.

In order to insure a satisfactory termination of the entire procedure, it is necessary to perform all the operative manipulations with the utmost precision; the bleeding during the operation must therefore be reduced to a minimum. For this reason I have performed all my operations intranasally and under local anesthesia, the patient sitting upright or in the semi-reclining position. With the patient lying down and especially under general anesthesia, it has been my experience that the congestion of the head is so great that adrenalin does not blanch the tissues or control the bleeding.

When the upper part of the nasal septum is deviated toward the side of the operation, a resection of the septum is advisable as a preliminary procedure. When the disease is bilateral, with a deviated bony septum, the wider side is operated first, then the septum is resected, and finally the other side is operated. It is often pos-

sible to push the deviated septum aside by means of a long-bladed speculum; but it always returns to its original position, and the swelling following such a traumatism has so often caused synechiae to form in this region that I have abandoned this practice.

Anesthesia is obtained by spraying a solution containing 10 per cent of cocaine and 1 to 2000 adrenalin into the upper part of the nostril; if compressed air of 25 pounds pressure is used the solution will be driven into the deepest recesses; but if necessary, subsequent applications can be made. A thorough toilet of both nostrils is of course necessary.

The first step of the operation is the removal of the entire middle turbinate, with the Holmes' scissors and the snare. Special attention should be given to the posterior end, which is often a pendulous mass of soft tissue of considerable size.

The opening of the cells is accomplished entirely with punch forceps. There are three kinds of forceps: (1) Forceps with flat serrated jaws, the "dressing forceps." (2) Forceps with jaws hollowed out, which meet edge to edge; they were originally called double curettes. (3) Forceps whose jaws are so constructed that the blades pass each other, the one blade passing through the second —these are the punch forceps. The curette is never used, not even for the purpose of opening the cells. The curette cannot cut through the soft parts except on the side of the bone nearest the instrument. On the distant side it only tears the mucous membrane and separates it from the bone. It is always my object to preserve the mucous membrane which remains in the nose and to preserve its normal attachment to the bone, which cannot be done when the curette is used. Besides, the curette invariably leaves shreds and tabs of mucous membrane and pieces of bone, which must afterwards slough off. For these reasons I have discontinued the use of the curette entirely. The same applies to all other instruments which have only one cutting blade.

Only such forceps are used in which the cutting edges of the blades extend back to the joint; forceps which can button-hole the parts are avoided. The most practical instruments are those in which a variety of cutting heads, each attached to its own shank, can be inserted into a universal handle; the head can be placed in a variety of positions, thereby lessening the number of instruments required.

It is of the utmost importance that the punch forceps should be exceedingly sharp. If they are dull, the mucous membrane is not entirely cut through and when the forceps are removed from the

nose, the mucous membrane is torn away from its attachment to the bone. I have seen the mucous membrane of an entire ethmoid cell torn out in this way, and the removal of the mucous membrane from a single ethmoid cell will delay the healing of the wound fully six weeks. The forceps can be tested by cutting moistened tissue paper, which they should cut clean. If necessary they must be sharpened. This can be easily done by turning over the edge of the blades with a hard steel burnisher. I consider this a matter of such importance that I invariably give it my personal attention before each operation.

The cells are easily penetrated by the blades of the forceps. I have devised a special forceps with trocar-pointed jaws for this purpose, but they have not proven especially advantageous except for entering the sphenoid when the natural orifice is small. It is immaterial whether the opening of the cells is begun in the anterior or the posterior group, the most prominent cell being the one selected. From this point the opening of the cells proceeds in a backward direction until all of the cells of the posterior group and the sphenoid cell have been opened, their entire inner walls and the partitions which separate them being completely removed and all converted into one single cavity.

The object of attacking the sphenoid at an early stage of the operation is as follows: There are four landmarks by which I have been accustomed to determine the limits of the spheno-ethmoid region, and to decide when all of the cells have been opened. The first of these is the roof of the posterior group of cells and the sphenoid is included in this group. It is immaterial whether the sphenoid or a large posterior cell is the highest of the group, if a line be drawn between the highest points of the roof of two or more cells of this group, this line when continued forward will pass through the roof of all of the highest layer of cells. In this way the floor of the skull is identified at an early stage of the operation.

The second landmark is the posterior border of the nasal process of the superior maxilla. The rounded border of this process can be located just above the lower turbinate, about one-half inch behind its anterior end. If the line of this border be continued upwards, it marks the anterior limit of the field of operation. Sometimes this line passes through the anterior end of the middle turbinate; at other times it passes in front of this point. In the latter case a large infundibular cell may be expected. When the posterior group of cells has been opened, the anterior cells are opened from behind forward until the anterior limiting line has been reached.

The line passing through the roof of the cells and the anterior limiting line meet in the upper and anterior part of the nose. At this point will be found the opening of the frontal sinus, which constitutes the third landmark. If all the anterior cells have been opened and their partitions removed, a probe passed into the frontal sinus will be found to be freely movable in all directions, and its shank will lie close to the anterior limiting line; for, if the cell walls have been completely removed, the naso-frontal duct will have been converted into an open groove. On the other hand, if the probe, in order to enter the frontal sinus, must be introduced at a point half an inch or more behind the anterior limiting line, and if, when introduced, it is nearly fixed in position and not freely movable, then the anterior cells have not been completely opened.

The fourth landmark is the natural orifice of the maxillary sinus. When the cells of the bulla and of the uncinate process have been opened, one at least of the natural openings of this sinus is easily accessible.

There is one part of the operation which requires particular care. It is the removal of the inner cell wall of the anterior ethmoid cells in the region of the cribriform plate. If the punch forceps be examined, it will be found that the female blade is always longer than the male blade, by about one millimeter. Now, the wall of the cells in this location is often quite thick. The roof of the anterior ethmoid cells is usually higher than the cribriform. If the female blade of the forceps is placed in the cell the end of the male blade can reach a point dangerously near to the cribriform. I therefore make it a rule to place the female blade in the nasal chamber and the male blade in the cell. In this way the cut made must always be at least one millimeter from the cribriform. It is also particularly dangerous to use a blunt forceps in this region. I therefore reserve for this part of the operation a forceps which has not been previously used, and to open the blades after the cut has been taken and before the forceps is moved from its position.

The final step in the operation is the removal of the partitions between the various cells. In my earlier operations, I considered it necessary to remove these partitions until the lamina papyracea was as smooth as a board. I have found since then, however, that this is not only a dangerous procedure, but that it actually prevents us from obtaining the best results from the operation. For, (1) the partitions become quite thick as they approach the lamina, and their removal requires considerable force. The lamina is no stronger than its thinnest parts and it can easily be fractured as a result of too

much enthusiasm. If this mishap does occur it is advisable to insert a periosteal elevator into the fracture, to separate the orbital periosteum, and to remove a good sized piece of bone; for, a large opening is much less dangerous than a small puncture. (2) The thicker parts at the base of the partitions contain blood vessels, which enter the ethmoid region from the skull and from the orbit, especially the anterior ethmoid artery and vein and their branches. When the removal of the thicker parts of the partitions is attempted, these vessels are apt to be injured, with very profuse bleeding. (3) The thinner part of the partitions contains hard bone only, but the base of the partitions contains cancellous tissue, which is more easily infected, resulting in necrosis, which delays or prevents the healing of the wound. (4) The scars which result when the base of the partitions is removed are broad and form a network of broad bands covered with squamous epithelium, diminishing considerably the area of ciliated epithelium which alone can satisfy the requirements of perfect function. (5) These scars surround the remnant of each cell like a purse string, and when they contract, they reproduce the cell cavity with only a minute opening. On the other hand, when the removal of the partitions is stopped just short of the thicker portions at the base, the danger of fracture of the lamina is avoided, severe hemorrhages are not so likely to occur, the cancellous tissue is not exposed and so the danger of bone necrosis and more serious complications is prevented, and finally the area of bare bone is much smaller, the edges of the mucous membrane are much closer together, healing takes place in a shorter time, and the scars which form are thinner and their contraction is less powerful, so that the cells remain wide open. This applies to the sphenoid sinus as well as to the ethmoid cells.

In removing the partitions it is essential that the forceps be placed squarely on the bone, so as to cut true on all sides at once. If the forceps are applied obliquely to the bone, the bone will be fractured before it is cut, and small fragments will be left behind, hanging to the mucous membrane. In addition, when the blades of the forceps are not applied true to the bone, the mucous membrane will be sheared off, so that the edge of the remaining bone will be bared of its periosteum.

It is advantageous to have at hand a variety of forceps in which the heads are placed at different angles with the shank. In addition to the straight forceps, used for the greater part of the operation, it is necessary to have at least two others: one with the head at an angle of 45° , the other at right angles with the shank. In general,

those forceps are most easily handled in which the male blade is above and opens in the direction of the handle, the female blade being below and being the stationary one.

The consummation of the technic as above described naturally implies the greatest accuracy and precision in all the manipulations. Such precision cannot be attained unless the operation is nearly if not quite bloodless. Bleeding during the operation comes chiefly from three sources. The first, which is the most frequent, is the oozing from the cut edges of the mucous membrane. Adrenalin controls the bleeding from this source at the beginning of the operation, but as the operation proceeds, the irritation of the mucous membrane from the traumatism of the manipulations paralyzes the constrictors of the blood vessels, and so counteracts the effect of the adrenalin. The mucous membrane, which at the beginning of the operation was blanched and white, has become red and congested. The application of more adrenalin does not restore the blanched condition of the mucous membrane, for the constrictors of the vessels have lost the power to respond to its action. The exuded blood there is also added a quantity of mucus which is secreted in increased amount. The mucus and serum, discolored by the blood, form a thick viscid wound secretion, which covers the field of operation and obscures and blurs the picture. In fact, under these circumstances, the operator sees, not the wound surface, but only the surface of the secretions. For the line of vision along which the operator must look when operating intranasally is nearly parallel to the surface of the field of operation; so much so that the angle which the line of vision makes with the wound surface is greater than the angle of total reflection of the wound secretions, and it is just as difficult to place the instruments accurately upon the parts desired as it is to touch a stone on the bottom of a pool of water with a stick when looking sideways at the pool of water. The wound secretions cannot be removed by means of swabs, for wiping the mucous membrane is merely another form of traumatism which increases the difficulty. The trouble, however, can be overcome. The secretions can be removed, the bleeding stopped, the vaso-constrictors stimulated and the mucous membrane again blanched by a very effectual, even if simple and obvious, procedure, which, if it has been used by other operators, is not recorded in their writings. It consists of irrigating the field of operation as often as may be necessary with ice-cold water. For this purpose, normal saline solution contained in an irrigating can is kept in a bowl of ice until needed. A canula, having the shape and size of a Eustachian catheter is

introduced far back in the nose, and the operated region irrigated until the bleeding stops. Then the inferior meatus is also irrigated to free it from blood-clots and debris. After such an irrigation, the entire field of operation appears dry and clean. To those who have never used such irrigations during an intranasal operation, the distinctness with which all the details of the field of operation are made to stand out will be an agreeable revelation. The patients do not object to these irrigations.

The second source of annoying hemorrhage results from injuring the nasopalatine artery during the removal of the anterior wall of the sphenoid sinus. This vessel leaves the sphenopalatine foramen and crosses the anterior wall of the sphenoid sinus a little distance below the natural orifice. When it is injured, the bleeding is very profuse, filling the nose with such rapidity that on more than one occasion I found it necessary to pack the nose both from the back and from the front, and to discontinue the operation for the time being. Since I have learned, however, to prevent this hemorrhage, the opening of the sphenoid sinus has lost its terrors. The procedure is as follows: The natural orifice of the sinus is first enlarged just enough to remove the margin of the bony opening. This can always be done without injuring these vessels. A slender periosteal elevator, such as is found among the Freer submucous resection instruments, is introduced between the bone and the proximal muco-periosteum and a pocket is made at least one-half inch deep in a downward and backward direction and extending laterally to the septum and to the outer nasal wall. The upper blade of a powerful dressing forceps is inserted into this pocket, and the mucous membrane and periosteum crushed. The forceps is held in place long enough for the vessels to clot. The crushed mucous membrane is then severed in a vertical direction with scissors or a narrow bladed forceps, and turned back out of the way. The opening of the sphenoid sinus may then be continued without any further thought of these vessels. I have employed this procedure many times, and it has never failed to prevent the bleeding. It is not nearly as difficult to carry out as it might seem to be from the description.

The third source of severe hemorrhage is the anterior ethmoid artery. This vessel enters the anterior ethmoid region from the orbit, passing between the ethmoid cells within the bony partitions. The bleeding from this vessel is not usually as profuse as that from the nasopalatine, but the operation cannot continue while it lasts. The vessel cannot be crushed, because it is usually contained entirely within the bone. The only way in which I have succeeded in stop-

ping this hemorrhage is by plugging the opening in the bone with bone-wax. The bleeding is stopped temporarily by holding an applicator over the vessel with one hand and applying the bone-wax on the end of a spatula with the other. It requires dexterity to accomplish this manouver, and it may not succeed at the first attempt; but I have stopped severe hemorrhages from this vessel by this means on several occasions. Fortunately it does not happen often.

After the operation the patient is put to bed, but the nose is never packed. If the post-operative oozing is pronounced it is easily controlled by spraying with adrenalin, coagulen solution or peroxide. After 48 hours the following routine treatment is employed. The nose is douched twice daily with normal saline solution, followed by a spray of 4 per cent solution of antipyrine. The antipyrine acts as an astringent and antiseptic and tends to prevent the granulations from becoming exuberant. In the winter time this is followed by a spray of albolene. In young and healthy individuals, when the operation proceeded without unusual occurrences, this is all that is necessary, and healing of the wounds is completed in about two weeks. If, however, the mucous membrane has been torn loose from the edges of the bone, if the edges of the bone have not been cut off clean, but if minute fractures have taken place, the healing is prolonged; for the bare bone which is stripped of its periosteum becomes necrotic and before healing can begin the dead bone must separate. Under these conditions granulation is delayed, the granulations tend to become exuberant. When the nose is examined during the convalescence, the parts are covered with a layer of mucus, through which it is impossible to see, so that the presence of granulation tissue is often overlooked. It is only when the nostril has been freed from mucus by douching, and after cocaine and adrenalin solutions have been applied, that the granulation tissue can be identified. For the cocaine-adrenalin solution shrinks and blanches the mucous membrane, but does not affect the granulation tissue. When the latter is present, it is dried with absorbent cotton and nitrate of silver applied. After drying off any excess of solution, the parts are sprayed with an oily medium. The strength of the silver solution depends on the condition of the granulations. When these are large and flabby, solutions as strong as 20 per cent are used. When they are small and firm, weaker solutions are used, and when epithelialization begins, solutions stronger than 1 per cent delay the process, while very weak solutions favor the growth of the epithelium.

In the large majority of the cases the healing of the wound is completed in 6 to 8 weeks, and further treatment is unnecessary. But the function of the parts has not yet been completely restored. For the mucous membrane of the cell interiors is infantile in character, and it takes some time before it assumes the thickness and consistency of adult mucous membrane. During this time the nose is sensitive to sudden changes in atmospheric conditions so that attacks of acute inflammation of this delicate mucous membrane are apt to occur. These attacks continue until the nose has experienced at least one complete cycle of such changes, *i.e.*, until one year has passed. During these attacks the mucous membrane becomes swollen, oedematous and greyish in appearance, sometimes distinctly polypoid. The surgeon who, upon seeing this changed mucosa immediately seizes his curette, makes a grave mistake, for if the inflamed mucous membrane is treated in the same way as the exuberant granulations are treated, but with milder solutions, the inflammatory changes will disappear in a few days, and the mucous membrane will return to a normal condition. Occasionally during the course of the convalescence, the mucous membrane, otherwise healthy in appearance, will be found dry and covered with crusts and flakes of dried mucus. This is due to the fact that the cilia on the surface of the mucous membrane fail to functionate. To restore the motility of the cilia, I know of no more efficient procedure than to douche the nose two or three times a week with a watery solution of menthol. This solution is prepared by floating menthol crystals on the surface of distilled water contained in a separating funnel or in a bottle with a stop-cock near the bottom. After 24 hours the solution can be drawn off at the bottom. This solution is much too strong to be used pure. It is usually diluted ten times, and in this strength it leaves a feeling of warmth in the nose for one or two hours. I have found but few individuals who could tolerate it stronger than one to four. The efficacy of this solution is due to the fact that it is a colloid solution, which mixes and dissolves readily with the mucus in which the cilia are imbedded, and so reaches the substances on the epithelial cells in a very efficient manner.

It is advisable to instruct the patient to lengthen the intervals of home treatment and to discontinue it altogether as soon as conditions will permit. For patients are very prone to contract the habit of nose-douching, and to keep it up long after the need therefor has ceased.

615 Madison Ave.

GANGOSA.

DR. HUBERT ARROWSMITH, Brooklyn.

Rhinopharyngitis mutilans, granuloma gangrenosum, kaninloma (Fiji). Gangosa is an ulcerative condition of the palate, nose, pharynx and skin surfaces of the body of unknown cause (though possibly a late sequela of yaws), which slowly spreads to the nose and larynx, destroying cartilage and bone and causing much deformity.

It is usually confined to an endemic area, comprising Guam, the Ladrone, Caroline, Batanes and Fiji Islands, Murray Island, Panama, British Guiana, Ceylon, Nevis, Dominica and Equatorial Africa. In the Anglo-Egyptian Sudan there is a disease closely resembling gangosa, though probably syphilitic. Sutton (Diseases of the Skin, 1919) says that cases suggestive of gangosa have been hitherto reported in Italy.

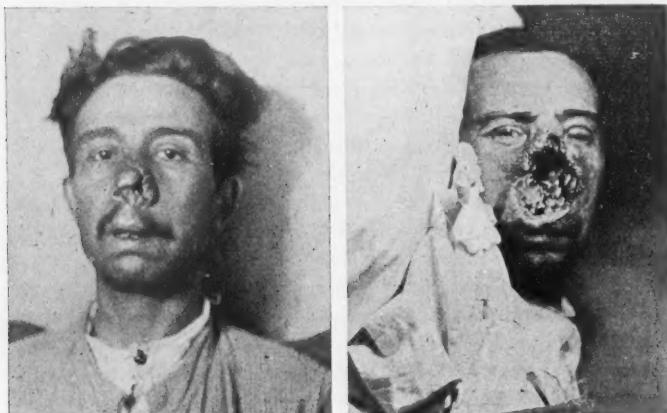
Etiology: Kerr has noted that yaws is an almost constant antecedent of gangosa. Musgrave, Marshall and Leys are opposed to the theory of a syphilitic causation because on the Island of Guam no syphilis exists, yet gangosa is common. There are no signs or symptoms of syphilis in this disease. Mercury is without effect. It is not leprosy, * * * epithelioma, * * * tuberculosis, but of unknown causation. Males and females are affected with equal frequency.

The disease appears to begin sometimes as a sore throat or coryza, or a tubercle of the palate. An ulcer soon forms, which, superficial at first, eats through cartilage and bone, with periods of activity and quiescence. This ulceration is due to a necrosis of the tissue elements, with very little reaction on the part of the body, the reaction being apparently limited to a small-celled infiltration, some giant-celled formation and proliferation of blood vessels, with formation of granulation tissue.

Histopathology: Microscopically the following changes are observed as the diseased area is approached from healthy tissue; there is an edematous infiltration, then an infiltration with round cells which are principally lymphocytes associated with another variety possessing more protoplasm and a small dark nucleus. Sometimes there are giant cells and proliferating vessels and always hemorrhages. Then comes a layer of necrosis forming the surface of the

ulcer, at the edge of which the epithelium can be seen sending processes into the subcutaneous tissue, which consist of large vacuolated cells with pale vesicular nuclei. Some diplococci, micrococci and bacilli have been noted, but no acid-fast bacilli or treponemata have been seen.

Symptomatology: A nodule may be seen on the back of the pharynx, posterior pillar or edge of the soft palate. This becomes a superficial ulcer, which spreads rapidly at first, more slowly later, and eats away the soft parts, then the bones of the palate, the nasal septum and the cartilages of the nose, so that the skin falls in and the nose and mouth are converted into one cavity. It may then extend to the face and lips or attack the larynx. In some advanced



cases the entire front of the face is replaced by a large opening ringed about by foul ulcers. A most objectionable odor is exhaled. Ulcers may appear on the skin of the extremities and other parts of the body.

The process appears to be in some way self-limited, as it does not attack the trachea or genital organs. Ulceration may progress from ten to thirty years, with periods of advance and quiescence, or it may cease within a period of a few months. The blood shows no particular change. The Wassermann test is often positive. A fulminating type has been described in children which is fatal in 48 hours and closely resembles diphtheria.

Prognosis: The disease is rarely fatal, most cases tending to recover; but the course is long and the disfigurement great.

Treatment seems to be without effect.

In a prophylactic way segregation seems to be effective. Since the adoption of this precaution in Guam, the disease is said to be decreasing. (Condensed from Castellani and Chalmer's Manual of Tropical Medicine, 3rd Edition, 1920.)

Ormsby (Diseases of the Skin, 1915) says that the disease is contagious and transmitted by direct contact.

Stitt's case (U. S. Naval Md. Bull., 1907, p. 96) has been hitherto the only undoubted instance occurring in a white man—a sailor who had previously spent several years in Guam.

E. B., aged 38, a laborer of Italian nativity, was admitted to the Dermatological Service of the Kings County Hospital, Oct. 14, 1919. The following indefinite history was elicited, the patient being very unintelligent and speaking almost no English. He had been in this country for a number of years and had never visited the tropics. According to his statement, his trouble started 17 months before he entered the hospital. He first noticed "a hard lump inside the nose," which at all times has been painless. Some ulceration occurred, but there has been no advance in some months. His general health has always been good. He denies venereal and all other previous illnesses. Mother died of old age and three brothers are living and healthy. He is well nourished. There are some black areas over the legs which he attributes to working in a sulphur mine.

There is enlargement and ulceration of the nose, considerable destruction of the soft parts and bone and a very foul discharge. The left antrum is perforated, the maxilla eroded and the pharynx and rhino-pharynx extensively ulcerated. Diagnosis syphilis, although the usual Wassermann and also an activated test were negative, as were numerous later reactions. Spinal fluid negative to Wassermann and colloidal gold tests. Repeated examinations of urine and blood showed nothing unusual.

Thorough anti-luetic treatment of all kinds was ineffective and no local treatment had any results. Dr. Winfield suggested gangosá.

On November 21, he was transferred to my service with the idea of a plastic operation when his disease had been checked. His appearance at that time is shown in pictures 19 and 20.

None of our efforts to stay the progress of the trouble met with any success and pictures 21 and 22 show the external appearance on March 15 of this year. The destruction of bony tissues was enormous and the odor indescribable. He was unable to take much food and his nutrition had suffered seriously.

Gen. Charles Richard, retired, of the Army Medical Corps, who has had a wide experience in the tropics, kindly saw the patient with me at this time and concurred in the diagnosis of gangosa.

Dr. Hala, our pathologist, submitted the following report on the tissue and Dr. Archibald Murray's statement was almost identical.

"The sections incorporate skin and subcutis. There are two changes observed in the epidermis: first, necrosis with replacement by rather septic granulation tissue; secondly, an atrophy of the epidermis, particularly of the strata mucosum and granulosum, with papillation more marked than usual. The corium is very cellular, moderately infiltrated with inflammatory cells in its superficial portion, markedly so in the deeper areas. The principal changes then are found in the deep layers of the true skin and in the subcutis. Here we find dense aggregations of cells, mostly of the polyblastic type. Small round, plasma, mast and epitheloid cells are numerous and rather closely packed together. Occasional multinucleated cells are observed. An occasional mitotic figure within a relatively large oval cell, the protoplasm of which is distinctly homogenous and hyaloid, is likewise encountered. The stroma in which these cells lie is a network of fibrous tissue; some of the trabeculae segregating rather large nests of the cells. The histological structure in general suggests a low grade chronic granulomatous inflammation with some areas of acute exudative inflammation. Stains for acid-fast bacilli and for treponemata are negative. Gram-Weigert sections show an occasional gram-positive diplococcus in those areas showing acute inflammatory foci.

Diagnosis: Granuloma (unknown origin).

On March 26, the patient became unconscious and had several convulsions, which recurred at intervals until his death on March 30.

170 Clinton St.

SEPTICEMIA AND DEATH FOLLOWING STREPTOCOCCUS TONSILLITIS.

DR. M. C. MYERSON, Brooklyn, N. Y.

The report of this case is made because of its apparently rare occurrence, and with the idea of conveying the impression that a simple sore throat may prove to be disastrous. I say apparently, because we note in our every day work the very severe general reaction accompanying an acute follicular tonsillitis, and I believe there must be occasional septicemias and deaths that should be reported and are not. A great many of these must be bacteremias, which are not classified as such because of the insufficient or inadequate bacteriologic facilities at our command in the individual case.

E. R., female, white, native American, age 40, was admitted to the King's County Hospital, November 13, 1920, at 12:30 a. m., in a semi-stuporous condition, with a temperature of 106.2°, a pulse of 150, and respirations 36.

The only history obtained from outside source was that she had had a sore throat for the past four days and had been in the care of her family physician. She became suddenly worse just prior to admission when an ambulance was summoned.

Examination at the time of admission shows a well developed, well nourished female of 45 years, who is semi-conscious and of very septic appearance. She responds feebly to commands to open mouth, turn head, and the usual routine requests during physical examinations. She attempts to reply when questioned, but her answers are mumbled and unintelligible.

Her body is covered by a generalized eruption whose lesions are discreet and of pin-point size, very profusely scattered over the entire body surface. It disappears on pressure and returns very quickly. There is no rigidity of the neck or other evidence of cerebral or meningeal irritation. Her pupils are contracted and fixed. Her mouth shows teeth in fair condition; the tongue is heavily coated. The mucous membrane of the upper respiratory tract is of angry red color.

There is an exudate on both tonsils which is not confluent, but whose distribution seems to be governed by the location of the tonsillar crypts. This is easily removed with no consequent bleeding.

The chest is well developed and shows the same eruption. There are coarse, harsh breath sounds transmitted wherever the stethoscope is placed; this is probably due to the collection of mucus in the nasopharynx. There are no significant rales or changes in tactile or vocal fremitus.

The heart seems enlarged in the transverse diameter. The apex beat is discernible in the sixth interspace and there is no arrhythmia or evidence of loss of tonus.

The abdomen is negative.

There is a loss of reactions for the usual neuro-muscular reflexes.

There is no Kernig, Babinski, Gordon, or other reaction indicative of meningeal irritation.

A provisional diagnosis of blood stream infection probably of tonsillar origin was made.

A culture was obtained from the tonsillar crypts, which was later reported hemolytic streptococcus.

The clinical behavior of our subject during her brief stay of seven hours was as follows: 12:30 a. m. (upon admission), temp. 106.2°, pulse 150, respiration 36. 4:00 a. m., temp. 106.8°, pulse imperceptible. 7:20 a. m., temp. 105°. Transfusion was at once suggested, but no donor had appeared up to the time of her death.

Fluids were administered by every route; patient was given atropine, caffein, adrenalin and stimulants as indicated. She urinated involuntarily at 6:30 a. m., and gradually succumbed to her overwhelming infection. A blood culture was taken just before she died; the report which was later returned gave the organism as streptococcus hemolyticus.

The patient came to autopsy and the report of Dr. Hala and Dr. Marten follows: It is the body of a well developed, well nourished, white female, aged between forty and forty-five years. Some post-mortem lividity is present posteriorly. There is an old operative scar in the midline extending from the umbilicus to the symphysis. No other external abnormalities are observed.

On median section of the body the fat in the abdominal wall is considerably increased, likewise the omental fat. The peritoneal cavity is grossly negative. The uterus and adnexa are missing, apparently having been removed at operation. On removal of the sternum no adhesions of the lungs are found. The heart lies free.

The epicardial fat is increased. There are numerous patechial hemorrhages into the epicardium. On section of the heart the right chambers are filled with "chicken fat" clot. The valves are

grossly normal. The aorta just above the valve cusps shows acute atheroma.

The lungs are congested and edematous, but are otherwise grossly normal.

The spleen is somewhat enlarged and rather soft. Grossly the appearance is that of a septic spleen.

The kidneys are congested. They are evidently the seat of an acute nephrosis which attacks particularly the labyrinth.

The liver is enlarged. It has a rather mottled appearance. On section the organ shows a fatty metamorphosis and cloudy swelling.

Cause of death, septicemia.

Findings: Septicemia. Pulmonary hypostasis and edema. Septic spleen. Parenchymatous degeneration of liver and kidneys.

The hemolytic streptococcus was isolated from the heart's blood after autopsy.

I will touch but lightly upon the complications which may accompany a tonsillitis. It is a matter of common and well accepted knowledge, verified by the clinical experience of every laryngologist and most medical men, that our patients have sequelae extending from the mildness of a cervical adenitis or a slight myositis to acute inflammatory conditions of any of the serous membranes, and general blood stream infections with fatal terminations. There is hardly an *itis* that has not been definitely linked with an acute or a subacute or chronic infective tonsillitis.

During the war the study of tonsillar crypt content, and the tonsil as an infection supply depot, received considerable impetus and attention. It was demonstrated by several workers that the hemolytic streptococcus was of considerably great frequency in the tonsil, their figures ranging from 6 per cent to 75 per cent of all individuals examined.

It was demonstrated that the tonsils of a healthy individual show just as definite pathologic changes as those of patients suffering from focal absorption, presenting the results of systemic infections, such as endocarditis, cholecystitis, nephritis and arthritis.

Why then do we not have more *systemic infections*, more bacteremias and deaths, the question may rightly be asked. The answer, according to Kellert, who has done very extensive research with hemolytic streptococcus in the tonsil, is that an erosion of the epithelium is necessary for a severe general infection from tonsillitis. He also points out the belief that in normal, healthy individuals, the action of the streptococcus hemolyticus is saphrophytic.

The necessity for knowing the offending organism in a case of acute tonsillitis is imperative, and our responsibility should not end when we have inoculated an agar slant and received a negative report for diphtheria. It is notoriously a fact that complications more frequently follow streptococcus tonsillitis than any other type of infection. Throughout an attack of tonsillitis one must always be on guard against complications, particularly is this so in streptococcus throats. Watch should be kept for joint or cardiac involvement. The urine should be noted for evidence of nephritis.

The definite offending organism has so frequently been found in the joints and endo and pericardium that it is quickly becoming the belief that a majority of cases of so-called rheumatism are of bacteriologic and septic type.

A streptococccic infection is treacherous in any locality. It is impossible to forecast what involvement will take place before the body forces or outside medical and surgical agencies can get it under control. Note the frequent mastoiditis and not at all infrequent sinus thromboses and brain abscesses in our streptococcus ear infections. A streptococcus infection is always one of the gravest types, if not manifestly, then surely potentially. Osler and McCrae state that septicemias of unknown origin are most frequently streptococccic.

I trust that this paper will convey the impression that an acute tonsillitis is to be regarded with a great deal of respect.

I wish to express my appreciation to Dr. Merrell for his permission to report this case.

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PULMONARY COMPLICATIONS FOLLOWING NOSE AND THROAT OPERATIONS.*

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Just what problem most prominently confronts us Rhinologists and Laryngologists at the present time is difficult to state. But, if rumor is correct, or the dictation of medical fashions continues to accuse us of negligence or carelessness in our operations, we may, to our mutual advantage, seriously consider the subject of pulmonary complications following the nose and the throat operations. On account of these distressing occurrences our specialty is more criticised at the present time than any other branch of medicine or surgery. Whether or not such criticism is just and proper is a debatable question. If the numbers of such complications are so small as to make the percentage a fraction of one per cent of the number of operations performed, the criticism becomes unjust.

Of the various complications in the chest which may follow our operations, that of acute abscess of the lung is most to be dreaded. According to Walker, surgery of the lung was first performed by Hippocrates. In the year 1664, Baglini opened a lung abscess resulting from a saber thrust. Many later instances are cited by various authors. In 1914, Scudder referred to a series of cases reported by Lord in the Massachusetts General Hospital previous to 1906. Scudder reported further the histories of 16 cases of acute lung abscess which were treated in the same hospital from 1906 to 1914; several of these followed tonsillectomies and one followed a resection of the nasal septum. Whittemore reported in 1914, two cases, one following the extraction of teeth, and the other following a septum operation. In 1916, F. T. Lord published an article which caused considerable commotion in medical circles by reporting 206 cases of lung abscess, 19 of which followed operations upon the mouth, nose or throat. In this article Lord states—"Owing to the scattered sources of this material, it is impossible to say definitely out of how large a number of operations on the mouth or nasopharynx these 19 cases have occurred, but is sufficiently disturbing to find about one in every ten cases of pulmonary abscess due to this cause." He stated further that "he believed that a certain number, if not all of them, could have been prevented by a greater cau-

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tion in the time selected for, and in the performance of these operations."

C. W. Richardson, in 1912, courageously reported two cases of his own, both of which recovered—one through operation and the other through medical treatment. In 1916, Manges reported a series of nine cases which occurred during the previous year in the Mt. Sinai Hospital, following operations on the nose or throat. This paper, and the discussion of it stimulated much writing and discussion.

At the present time two distinct theories are advanced as to the cause of lung abscess occurring after operations in our field of work. Certain authors state their belief that they arise as a result of the inhalation of blood clots, pieces of tonsil, adenoid, or of the debris from the crypts of diseased tonsils. Others believe they arise from emboli and septic infarcts.

The theory that lung abscesses are embolic in their origin is comforting; but on what scientific basis does the theory rest? So far as I am aware, nobody has attempted more than to state his opinion on the matter. To prove the theory is next to impossible. The surgeons, pathologists, bacteriologists and internists in Boston whom I have consulted on the subject are skeptical regarding the embolic theory. A few of them are undecided, but the great majority think, that while the embolic origin is theoretically possible, it is, in the great percentage of the cases, quite improbable.

Embolus unquestionably develops after operations in the abdomen and pelvis and from disease of the large veins in other parts of the body.

EMBOLISM.

Adami describes embolism as being "anybody carried along by the blood stream until, with the narrowing of the lumen, it becomes arrested and blocks the vessel." Of the ten varieties he mentions, only two, liberated thrombus and bacterial, need be considered as causal factors in lung abscess.

Many years ago, Adami called attention to bacterial embolism. He described a process by which bacteria could travel from one part of the body to another by means of the blood stream. It is possible for bacteria to find their way into the venous-blood stream if the vein-ends open into septic wounds. In this event infection may enter the vessel through the clot in its end, or through the vessel wall itself if the wall had been injured by operation or inflammatory process.

The opposite theory for lung abscess, that of inhalation, requires no stretch of the imagination. The wonder is, that it does not happen more frequently, even in the experience of the most careful specialists. Considering that thousands upon thousands of nose and throat operations are performed each year by physicians who have had little training in the work, it is extraordinary that so few inhalation accidents occur. I am positive that if a careful record could be obtained of all pulmonary complications following nose and throat operations which occurred during the year 1920, and these could be compared with the total number of operations performed, the result would be astonishingly small. A certain number did occur, however, and it is our duty, if possible, to devise ways in which these can be reduced.

How many of us realize the extent and size of the cavity of the lungs? Howell makes the amazing statement that the inner surface of the lungs is as much as 90 square meters, more than one hundred times the surface of the skin. The air capacity of the lungs in the average male is given as 3700 cc. The passing of the air stream to and fro, or tidal wave, as it is called, is about 500 cc. in quiet, normal respiration, but in forced respiration it may rise to 1600 cc. The passing of the tidal air in and out of the lungs, is to us a matter of vital importance, for our operative fields are dangerously close to its influence. The less the cord opening the greater will be the suction through this narrow space. The passing of 1600 cc. of air through the partially or even fully open glottis in about one second of time creates no small force. If a good-sized nail, a lead toy, large coins, or a considerable variety of metallic objects can be drawn into the trachea or bronchi during forced inspiration, is it any wonder that blood, clots, mucous, or pieces of adenoid are caught in this powerful air stream and deposited deep in the lung? This *would* be a common occurrence in our operating but for one reason: nature, realizing the danger, provided the breathing apparatus with a marvelous system of reflexes which guard it well. These reflexes are so tremendously important to our work that we may at this point give them special consideration.

First in our field is the nasal mucous membrane. Stimulation of its sensory fibres cause an inhibitory action of respiration, which protects the lungs from irritating and injurious gases, a protection against too strong ether vapor. The nasal reflex in man is more or less temporary, but Frederick states that if, in aquatic birds, water is allowed to flow over the beak so as to penetrate slightly

into the nostrils, it brings about an inhibition of respirations lasting for many minutes.

The pharynx receives its reflex from the sensory fibres of the glossopharyngeal nerve. Stimulation of this area produces arrested respiration and a closure of the cords during the act of swallowing. A foreign body of any size in this location will produce similar action.

The mucous lining of the larynx receives its sensory fibres from the superior laryngeal nerve. Stimulation closes the glottis by contraction of the adductor muscles, and it also produces temporary suspended respiration or cough.

Cough is produced by a powerful compression of the confined air in the lungs against the closed cords. The cords suddenly open and the elastic compressed air, still under the pressure of the muscles, suddenly escapes through the narrow glottis with a great force, carrying any foreign matter or fluid with it. Forced exhalation, with opened cords, which has practically the same muscle action, will produce but a fraction of the power of cough.

If anesthesia is carried to the point of abolishing the throat and lung reflexes, all of the beautiful natural protection of the lung cavity is gone. The larynx is partly open, cough is no longer available, the bronchi are dilated to their widest extent and the smaller bronchi (because of their rings making them uncollapsible) are open pathways to the minute bronchioles and aveoli. Nor is this all! As stated previously, the tidal air in regular, natural breathing is about 500 cc. for both inhalation and exhalation, but the period of inspiration is approximately three times that of exhalation, hence there is that much greater opportunity for foreign matter to enter the lung than to leave the cavity.

No reflex connected with the throat or lung can hold for a given time against a stimulation from the inspiratory centre in the medulla oblongata. When sufficient CO₂ accumulates in the blood to stimulate this centre, all forms of reflex which cause suspended respiration become inactive. This is also true of voluntary efforts to hold the breath. When the respiratory center sends forth its stimulation, the diaphragm draws down and all the chest muscles which expand and elevate the ribs act in unison with it. If the patient has been without oxygen for some time the need for fresh air is great and insistent, consequently inspiration will be sudden and deep. The greater the need for air, the deeper and more powerful will be this movement. Violent in drawing of the breath we call a gasp. It may occur, of course, at any stage of etherization, but it is far

more apt to occur when the anesthesia is light. It is especially likely to occur when strong ether vapor is present, because of the reflex fixation of the cords. If foreign matter is near the entrance of the larynx at this time, it is reasonably sure to be drawn through the glottic opening and carried into the large air passages.

Sudden inspiration of blood clots or of thick mucous is a most dangerous occurrence. The in-rushing air may carry the foreign material into the deeper channels of the lung, where the cough reflex will be too feeble to expel it. Once wedged into a small tube, contraction and edema would soon occur, and no *available* force could then expel the foreign body. If the plugging material is not septic, nature will, in time, probably absorb it, provided, of course, that the collateral circulation is maintained. But if sepsis is present, abscess formation or pneumonia will doubtless result.

There is one more reflex which we have not considered thus far, namely, vomiting. Vomiting is, as you know, a violent contraction of the abdominal muscles. It is similar to cough, but has, in addition, certain reflex action of the abdominal organs. In vomiting we have the same air compression in the lungs as in coughing. But when the cords relax, they apparently do not open so widely, as in coughing, which is probably the reason for the disagreeable sounds emitted during the act of vomiting. Vomiting may clear the lungs of foreign matter, or it may cause foreign matter to enter the breathing cavity. It may be either a blessing or a curse, since it may save the patient's life or cause his death. Hence, it cannot be depended on to rid the lungs of inspired substances after ether operations. More than one lung abscess or ether pneumonia has had its beginning after the patient has safely left the operating room because of inhalation of stomach contents during vomiting. Children who are in their homes on the morning of operation and have been denied their usual breakfast sometimes steal food without their parent's knowledge. Later, when ether is administered the stolen food is vomited, greatly to the danger of the child. Again, soft-hearted parents give children food before operations, thinking, in their ignorance that the doctor will not know. Both such incidents have happened in my practice more than once. Precautions against this danger are necessary.

Before leaving the subject of the danger from inspiration, I wish seriously to call to your attention another factor in this situation which I consider of extreme importance. Nose and throat patients, above all others, have a tendency to over-secretion of the glands

of the mouth, pharynx and larynx. The very nature of their troubles naturally brings this about. If the secretion is not great in amount, or if it is of a thin-fluid nature, it is a matter of little consequence. If the amount is great, or if its consistency is viscid, it then becomes a menace to the patient's safety. Labored breathing, deep cyanosis, suspended respiration and other highly disagreeable symptoms not infrequently develop from this source. To do away with this danger would be a great step forward in our work. Attempts to overcome this handicap is made a matter of every-day occurrence by the administration of atropin before the time of operation. This custom is so universal that it seems egotistical to question it. Nevertheless, I strongly and honestly believe that this practice is in many cases a mistake. The use of atropin in marked cases of over-secretion makes conditions worse by further thickening of the mucous. In an aggravated case, no physiological amount of atropin can completely remove over-secretion. Long, thick ropes of mucous not infrequently seriously embarrass the patient's respiration either by forming in the trachea or by gaining access to the larynx from surrounding structures. Such ropy accumulations must be vigorously dealt with to maintain free respiration. Sponging often fails to afford relief because of the length of the rope of mucous and its extremely sticky, clinging nature. Placing the patient in a position where the mouth and throat are lower than the larynx is the safest and most satisfactory method of ridding him of this embarrassing complication. The ease with which this procedure is carried out is one of the chief advantages of the sitting position in nose or throat operations. My intention was to omit from this paper the subject of the position of the patient, but the value of the sitting position is so great in respect to getting rid of mucous secretions, that I feel in duty bound to mention it in this one respect. The use of morphia before operation is another custom which is widely in use. In my experience, morphia interferes with even respirations during the latter part of anesthesia. In not a few cases morphia seems to depress the inspiratory centre, causing shallow muscular action, which gradually becomes slower and weaker. This tendency to an altered respiration toward the end of the operation happens in both men and women, but most often in the latter. Objections to both morphia and atropin were first brought to my attention by Dr. F. L. Richardson, one of Boston's leading anesthetists. We have operated together many times, and both feel that morphia and atropin have no place in our surgical work.

ANESTHESIA.

If a nose or throat operation is to be performed under a general anesthesia, the anesthetist shares equal responsibility with the surgeon. Under proper conditions it is possible for the anesthetist to keep the patient breathing quietly with laryngeal reflexes present, and yet be sufficiently passive to allow the operation to proceed for almost any length of time. Not every anesthetist can produce so perfect a performance, for it requires long experience, special knowledge of nose and throat work, and last but not least, special apparatus. Smooth, even anesthesia for our special work cannot be given by the open-cone method. There must be a constant, carefully measured mixture of ether and air constantly passing into the lungs. A pump of some variety is used, either a foot bellows or a small air compressor driven by a tiny electric motor. In recommending motor or foot-driven apparatus I am not unaware of Clendening's article in the Journal of the A. M. A. of April 3, 1920. The claims made against a proper power-driven apparatus are much over-estimated and are distinctly a step backwards in nose and throat anesthesia. To show to what extent our anesthetists have the patient under perfect control, I will state that they can cause him to cough whenever they desire by causing a very strong ether vapor to run through the tube for a few seconds. This is so suddenly irritating to the patient's pharynx and larynx that he almost invariably coughs, and in so doing dislodges any troublesome mucous or blood. Naturally, this procedure would be impossible with a patient who had lost the laryngeal reflexes through complete surgical etherization.

From another point of view, to operate skillfully we must first of all have a proper view of our field of work. To obtain a view of the throat it is necessary to use some sort of device which will keep the jaws apart. The selection of this instrument is of more than ordinary importance. A poor gag is an abomination, and there are many such instruments in use. Personally, I have never seen but one that suited me. This is the Davis Sewell type, which not only keeps the mouth open, but keeps the tongue out of the way. This instrument, however, has two drawbacks. First, the long handle must be kept constantly drawn forward away from the chin, otherwise the tongue is forced backward and downward, and the patient ceases to breathe. Secondly, if the patient is too lightly etherized he may bite down on the central plate and break one or more teeth. This happened to me only once since I have been on the watch for it. Except for these two objections this instrument is perfect for its purpose. It gives a wide, clear view of the throat.

The operator has the free use of both hands, any bleeding is easily seen, and the most delicate manipulation of instruments is possible. To me, assistants trying to hold the tongue depressor or to manipulate sponge forceps, are distinctly in the way.

So much has been written on the tonsil operation that it would seem futile to mention it further. Yet, if we are to do away with the dangers of inhalation, many of us have still something to learn. Bloodless technique is our aim and desire. By bloodless technique I mean not only a bloodless operation, but a post-operative wound which remains bloodless until it is thoroughly healed. Blunt, crushing operations may be entirely free from hemorrhage at the time of operation, but they have occasionally a disconcerting habit of bleeding later. Post-operative hemorrhages increase the danger of pulmonary complications many fold, since in this emergency our usual precautionary measures cannot always be carried out. I am not expressing my opinion alone in this statement, for the literature sustains me fully. Blunt instruments used in dissection of the tonsils by no means give immunity from bleeding. I know of one lung-abscess case which followed a dissection by the fingers. My own experience has taught me that sharp instruments not only give much less hemorrhage, but much less soreness afterwards. When the tonsil is removed with its capsule intact there will usually be seen on the posterior pillar one or more trickling streams of blood from the veins. From experience I have learned not to sponge them. If allowed to continue for a few seconds they invariably stop themselves. Occasionally a vein at the junction of the anterior pillar and the constrictor muscle will behave in much the same manner. Sponging of the tonsillar fossa is, in my opinion, not only unnecessary in the average case, but it prolongs the bleeding and very decidedly increases the soreness afterwards. Probably nothing we could do during our operation could equal rough sponging of a freshly opened wound as a method of producing an embolus from the tonsillar veins, if such a thing is possible. In the sitting position free bleeding from the tonsillar fossa, if the patient is breathing regularly and quietly, need not be feared from the standpoint of the larynx and trachea. The fluid blood will fall by gravity directly into the pyriform sinus, and pass to the stomach. This is not true, however, of large clots or of considerable quantities of blood mixed with mucous, since they may find their way into the larynx.

In nasal work, if adrenalin fails to produce a dry operative field, care must be taken to prevent blood or clots from falling into the

post-nasal space. In all sinus work within the nasal cavity I invariably pack the posterior nasal space. In the septum operation I use strips of gauze laid on the floor of the nose, and change them frequently during the operation if they become blood-soaked. I am well aware that packing the posterior nasal space is not a popular procedure, but nevertheless I feel that it is a safe precaution in all cases where there may be any great amount of hemorrhage. Naturally, if used at all, it should be put in place before the hemorrhage occurs, and not afterwards. This may seem like foolish advice, but I have seen it happen within two weeks.

Post operative cases. Before the patient leaves the operating room all trace of hemorrhage should cease. No good surgeon will permit a bleeding patient to be removed from the operating room. The manner in which the patient is carried to his room is of extreme importance. If he is placed on a wheel table, his only allowable position is on his side with his head on the table and not on a pillow. If carried on a stretcher down a flight of stairs he should always be taken head first. Such a position might seem to provoke bleeding, but I never knew this to occur. It would be more desirable, however, to have bleeding than an inspiration accident. We must always bear in mind that nose and throat patients come out of their anesthesia to the vomiting point very rapidly after the ether is taken away. A vomiting patient being carried down stairs, feet first, would be in a position of extreme danger. I know of a patient who not long ago died in the elevator while being taken from the operating room to his bed.

When a patient is placed in bed after an operation, a skilled nurse should always be in attendance until the patient is able to care for himself. To show that inhalation accidents happen at this time, I will report the history of one of my own patients. Several years ago a young man who had been operated on and was safely back in bed, suddenly showed signs of great distress and deep cyanosis. The nurse rushed to the operating room, where I was operating on a second case. We found the patient nearly asphyxiated. His jaws were locked tight and doubtless the tongue had fallen backward sufficiently to prevent respiration. When we turned him on his stomach, with his head extended over and below the edge of the bed, he almost immediately re-established respiration, but on the next day he had a chill, followed by high temperature, and within forty-eight hours had all the symptoms of pneumonia. He was very ill for some days, but recovered.

Patients who should know better not infrequently do things which are most unwise. A highly educated man whom I operated on, against advice, drove sixty miles in a rainstorm in an open automobile four days after a septum operation. The following evening I was informed by telephone that he was very ill with pneumonia. Fortunately, pneumonia did not develop. Last summer another patient whom I had operated on a few days before took a long walk in a cold, rainy evening, getting both chilled and wet. This patient was soon taken ill and was later pronounced to have a lung abscess. Fortunately, it was not true.

Had these two patients died, their deaths would have added two more cases to the statistics of pulmonary complications following nose and throat operations.

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THE RELATION OF THE INTERNIST TO DISEASES OF THE MIDDLE EAR AND MASTOID PROCESS.

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Coincident with the great advances which specialization has brought about in medicine, and the many advantages resulting therefrom, are certain disadvantages which must be immediately apparent. Not the least of these are the special meetings and section groups. The meetings of the American Medical Association are associations of special sections interested in special, definite subjects. The same holds true of the meetings of the State Societies and, to a very large degree, of the local society meetings as well, so that in the interest in the part there is often danger that its relationship to the whole may be forgotten. One is almost reminded of the experiences of the six blind men of Indostan with the elephant, in Saxes famous poem. Papers are presented and subjects discussed, not before those who need them most, but, it would sometimes seem, before those who need them least. Thus, it may easily happen that the only knowledge which a practitioner, of several years experience, may have of a special subject is that which he has gained as a medical student. So it has seemed to the writer that a brief review of the present-day attitude of the otologist to diseases of the middle ear and mastoid process might not be without value to the internist or, if one may use that much abused term, the general practitioner. He it is who first comes in contact with disease of these structures and unfortunately, in many cases, its complications. Upon him rests the responsibility of suggesting special attention before the golden opportunity has passed.

A few unfortunate experiences have served to convince the writer that general knowledge on this particular subject is today on a par with that of appendicitis 30 or 40 years ago, immediately after its emergence as a distinct entity from the nebulous haze of inflammation of the bowels. Today the possibilities of the ordinary "belly ache" are well known and few cases of appendicitis escape early diagnosis. The same internist who will not fail to make a diagnosis of appendicitis will wait patiently for a tympanic membrane to rupture and will view with equanimity a chronic discharge from the middle ear. While early paracentesis cannot in any sense be looked upon as a preventive of mastoid involvement, it certainly renders this complication less likely. Only in the exceptional instance does it fail to relieve at once the pain, which no one can appreciate who has not experienced its horrors. Above all, it gives almost certain assurance of the restoration of normal hearing. The technique of

examination of the tympanic membrane can be acquired with no great expenditure of effort. Such examination should be a regular part of the routine procedure with every infant. Here middle ear inflammation is oftentimes the sole cause of an otherwise inexplicable rise in temperature. Without such examination the physician is often first apprised of the condition by the appearance of a discharge from the middle ear.

The more common signs of mastoid involvement, aurial discharge, pain, fever, post-auricular swelling, with characteristic displacement of the auricle, are readily recognized by the practitioner. They are recognized almost as readily by the family and neighbors, indicating that no great diagnostic acumen is called for in such cases. The above signs are also characteristic of an advanced external otitis. Here the differential diagnosis is often a matter of extreme difficulty. During a hospital experience of several years' duration it has been unusual not to have each successive house officer fail at least once to differentiate between these two conditions, the correct diagnosis being subsequently proven by operation. The difference in operative procedure called for in the two conditions and the importance to the patient of a proper diagnosis is at once apparent.

The more insidious signs of mastoid involvement are usually overlooked. Among the latter may be mentioned continued pain and tenderness over the mastoid process, with no post-auricular swelling, and sagging of the posterior superior canal wall. Tenderness over the mastoid process and persisting for 2 to 5 days is not unusual in an uncomplicated otitis media. Its continuance is indicative of mastoid involvement. Fever, if present, is suggestive. Its absence proves nothing. Above all must be mentioned a continued discharge from the middle ear persisting for more than 6 weeks, under proper treatment, and with no other signs of mastoiditis. This in our experience is an unfailing sign. The above rule has been religiously followed over a period of years and, I can truthfully say, in not a single instance has operation failed to prove the correctness of the diagnosis. Two cases, one in a physician, the other in a physician's wife, will serve as examples. In both the mastoid process was filled with pus and granulation tissue, while the lateral sinus in each lay exposed, covered with granulation tissue and bathed in pus. Early operation undoubtedly in each case prevented a thrombosis of the lateral sinus. Each case went on to uninterrupted recovery with no sign of lateral sinus involvement. Not the least of the advantages from early opening of the mastoid process and the securing of efficient posterior drainage is the restoration of normal hearing.

It may be stated, as a truism, that in 99 per cent of cases a chronic discharge from the middle ear is final and conclusive evidence of ignorance or neglect on the part of the individual, his family or, not infrequently, his physician. Not only with the laity, but also too frequently with the profession, a continued discharge from the middle ear is looked upon with no concern, while its cessation is taken as a sign of unfavorable prognosis. Not infrequently patients have volunteered the information that they have been informed by their family physician that they need have no fear so long as the discharge continued. In such cases it would have been far better if the physician had expressed no opinion at all. The confidence thus established in the patient has not infrequently resulted in his failure to secure proper relief until intra-cranial complications have rendered operation an extreme risk or of no avail. Cessation of aural discharge *may* be a sign of beginning intra-cranial involvement. It is also a sign that the process, even though an old one, is going on to resolution. No physician should be unmindful of the fact that a discharging ear is always a dangerous ear. No insurance company of any standing will accept a risk on an individual so afflicted. It is also an absolute bar to military service.

Such a patient may go on for years in evident health and vigor, when a sudden infection will give rise to an acute exacerbation with fatal termination. The natural avenues of drainage are circuitous and insufficient at best. The close proximity of the lateral sinus and cerebellum posteriorly, the temporo-sphenoidal lobe superiorly, and the inner ear and labyrinth internally, render intra-cranial complications extremely likely. When one remembers the extreme thinness of the intervening bony walls and the extreme rapidity with which these may be eroded by pus under pressure, such an outcome is not to be wondered at. Intra-cranial infection may occur, not only by direct continuity, but by blood and lymph channels as well.

The danger from a dry ear, but with a perforation in the tympanic membrane, should not be overlooked. Infected water, or any fluid, entering the external canal in such cases gains immediate access to the middle ear cavity and its connecting air spaces. Such a condition is of decided danger in its relation to swimming. Even with the greatest precautions it is almost impossible to prevent infected water from entering the middle ear cavity. The following cases will serve as illustrations:

The first was seen in consultation with my associate, Dr. C. E. Pitkin. A senior high school student in apparently perfect health went swimming one evening in the lake. This was followed by pain,

headache and discharge from the right ear. There had been a history of periodic discharge from this ear since childhood. Subsequently there were chills with an afternoon temperature of 106° and remitting almost to normal in the morning; in short, the classical picture of a thrombosis of the lateral sinus. Consultation had not been sought until two weeks after the beginning of the initial symptoms. The patient was markedly icteric, with some cardiac involvement. There was no sign of meningitis. The tympanic membrane showed a small perforation in Schrapnel's membrane and recognizable with difficulty. The jugular on ligation was found completely collapsed. On opening the mastoid the bone over the sinus was necrotic and the sinus filled with a foul pus under considerable pressure.

The second case was seen in consultation with a fellow practitioner. There was a history of periodic aural discharge. After an evening of swimming and diving in the Y. M. C. A. pool, there was a marked increase in the aural discharge with pain, headache and fever. Examination 3 days after the beginning of the attack showed all the classical signs of a well established meningitis, together with a large perforation in the right tympanic membrane, evidently of long standing. The ear in this case, as in the one previously cited, had been the avenue of infection.

From the foregoing the following conclusions may be drawn as axiomatic in present middle ear and mastoid surgery:

- (1) Examination of the middle ear should be a part of the routine procedure with infants.
- (2) In otitis media early paracentesis relieves pain, makes mastoid involvement less likely and gives almost complete assurance of the restoration of normal hearing.
- (3) The mastoid process may be extensively involved without the usual external signs.
- (4) A profuse discharge persisting for more than six weeks, in the absence of all other signs, is presumptive evidence of mastoid involvement and calls for operative interference.
- (5) Early posterior drainage through the mastoid cavity involves little operative risk, renders intra-cranial involvement unlikely and above all, in the vast majority of cases, assures normal hearing.
- (6) A chronic discharging ear is always a dangerous ear. It should receive attention before the occurrence of intra-cranial complications.

Osborn Bldg.

A DIRECT-VIEW, SELF-RETAINING LARYNGOSCOPE.*

DR. MAX UNGER, New York City.

This instrument is a modification of the direct-view, self-retaining laryngoscope devised by the writer in 1914, and described at that time in the *LARYNGOSCOPE*. This presentation is in the nature of a further preliminary report, as the instrument is still in the process of completion, but it is now sufficiently perfected to demonstrate its simplicity and adaptability, and its superiority over the cumbersome and complicated suspension apparatus.

Through the kindness of Dr. T. J. Harris, it has been possible to use it on about two dozen cases at his clinic at the Post-Graduate Hospital, children and adults, under local or general anesthesia, and

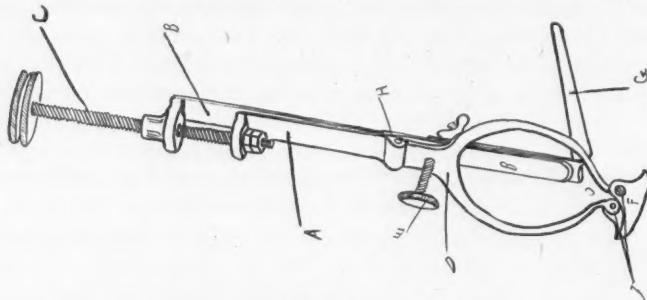


Figure 1.

to show the ease with which it could be introduced, the wide exposure it permits, and its adaptability to all classes of cases requiring direct exposure of the larynx.

This laryngoscope, as shown by the diagram (see Fig. 1), consists of the following parts: A is the front bar and B the rear bar, made to slide upon each other in a longitudinal direction, the movements being controlled by means of screw C. Pin X and slot Y control the direction in which they move. D is the horseshoe-shaped supporter of the palate-plate F. The horseshoe is hooked on to the front bar A, at H, and is moved to or from the rear bar B by means of screw E. The palate-blade F is fastened to the prongs of the horseshoe by pins which allow free motion at J. G is the tongue-blade, which is removably fastened to the rear bar B. There are

*Presented before the New York Academy of Medicine, Laryngological Section, March 23, 1921.

six sizes of these tongue-blades, allowing the use of the instrument on patients of all sizes.

The method of using the laryngoscope is as follows: The patient is anesthetized (either local or general anesthesia) and placed on a



Figure 2.



Figure 3.

table, face upward, with the head hanging partly over the edge. The laryngoscope—with the screw end up and palate-blade close to the tongue-blade—is introduced into the patient's mouth, the tongue-blade being used to lift the tongue.

The observer looks through the aperture O. When the epiglottis comes into view, the end of the tongue-blade is slipped under it and lifted. The palate-blade is now slipped inside the upper teeth, and the screw C is quickly turned so that the palate-blade is brought into contact with the hard palate back of the teeth. The screw C is then turned till firm resistance is met. This operation separates the palate-blade from the tongue-blade and serves to lift the tongue and epiglottis from the line of vision so that the arytenoids and vocal cords are brought into view. If the anterior commissure is not visible, it can be made so by turning the screw E. This serves to tilt up the distal end of the palate-blade and expose the anterior commissure.

The action of screws C and E in wedging the instrument into the mouth makes it self-retaining. Only a light touch, at the most, is needed to keep it in alignment. The instrument is easily removed by turning the screws C and E in the reverse direction.

Figures 2 and 3 show the relations of the parts of the instrument to the surrounding anatomy after proper insertion.

253 West 42d St.

A CASE OF TRAUMATIC ABDUCENS PARALYSIS.

DR. JOS. FRIEDMAN and DR. S. D. GREENFIELD, Brooklyn.

Abducens paralysis occurring in connection with the so-called Gradenigo's syndrome is due either to an infectious neuritis involving the nerve trunk directly, or to pressure from inflammatory edema in the surrounding tissues. In both instances the process originates in the middle ear spaces and progresses to the cells in the apex of the petrous pyramid. The inflammatory changes extend through to the periosteum at this site and so involve the nerve trunk in its course to the dura.

Abducens paralysis may occur in inflammatory diseases of the posterior fossa. In a large extradural abscess the swelling of the dura may be at the point of entrance of the nerve and here exert pressure upon it. In thrombo-phlebitis of the inferior petrosal sinus with which it is in close relationship, thickening of the tissues around the nerve may produce constriction.

In injuries to the base of the skull, the abducens nerve may be injured. In fractures involving the petrous portion of the temporal

bone, especially is the nerve apt to be involved. However, it has been conclusively shown that an actual fracture need not occur and that the sixth nerve may be affected as a result of ordinary concussion injuries to the base. In these cases hemorrhagic extravasations take place about the nerve and so cause compression of the nerve filaments with interference of their function.

Fracture of the base of the skull may occur with definite clinical manifestations, and yet the roentgenologist will find it difficult to demonstrate to our satisfaction the actual line of fracture. Since this is so, it is very evident, therefore, that our diagnosis must be based largely upon our clinical findings and the X-ray can only be used as one of our aids in making the diagnosis. In a case recently reported by us in the *N. Y. Med. Journal*, dated January 29, 1921, "Fractured Skull With Report of Case Complicated by Acute Mastoiditis," the X-ray showed very distinctly the line of fracture.

In the case we are reporting, there were definite clinical evidences of a fractured base, viz.: the presence of blood in the cerebro-spinal fluid, profuse bleeding from the external auditory canal and paralysis of the abducens nerve on the corresponding side from which the bleeding came. However, the X-ray failed to reveal the line of fracture, but nevertheless, even without this important corroborative evidence, a diagnosis of fractured base was made.

Report of Case: Orlando B., aged 17, fell from a stepladder and landed on his skull on April 21, 1921. He immediately lost consciousness and was brought to the Coney Island Hospital in a state of profound coma.

Physical Examination at Time of Admission: Scalp over the right parietal region was swollen and edematous, but no break in the superficial continuity was noted. There was profuse bleeding from the right external auditory canal, examination of which revealed a rent in the superior wall and a laceration of the drum membrane. The pupils were dilated, equal and reacted promptly. No other external injuries were noted. The patient had vomited twice on the ambulance, the vomiting being of a projectile nature. After being at the hospital for several hours, the patient gradually regained consciousness. He complained bitterly of a severe right hemicrania, which became almost intolerable toward evening. A lumbar puncture was advised and fluid under extreme pressure was obtained. About 60 cc. were withdrawn, the fluid being tinged with blood. Microscopical examination showed increased cytology—twelve cells per c.mm., with the presence of erythrocytes.

Examination on April 22, 1921, disclosed the following: Temperature 101° pulse 67, respirations 26. The patient was conscious, but drowsy and stuporous, responding to interrogations slowly but accurately. There was no rigidity of the neck and all the reflexes were normal. There was absence of spontaneous nystagmus and the patient did not complain of vertigo. Examination of the eyes revealed the presence of a paralysis of the right external rectus. When looking to the right the patient complained of diplopia, which increased upon further looking to the right. Examination of the right ear, after removing all blood clots, disclosed a lacerated drum membrane, the tear being vertical, extending from above downward in the posterior half of the drum, through Shrapnell's to a point a little above the level of the umbo. Hearing in the right ear was slightly impaired.

In view of the fact that there were no distinct symptoms of cerebral compression and no evidences of any intracranial complication, a more or less expectant plan of treatment was followed. An icebag was applied to the patient's head and otherwise made comfortable. A series of X-ray pictures were taken, but none of them succeeded in disclosing the line of fracture.

April 23: Patient was somewhat brighter. Refused to take food. Temperature 101° , pulse 60, respirations 27. Lumbar puncture performed; fluid under pressure, 40 cc. withdrawn. Fluid clear, no globulin; 7 cells per c.mm. No red cells found.

April 24: The patient's condition remained practically unchanged. The temperature in the evening reached 102.4° , but otherwise nothing unusual was noted.

April 25: The patient complained of general aching in the muscles and joints, with headache. There was malaise and the patient refused food. Temperature was 103° , pulse 70, respirations 31. Examination of the right ear showed an absence of discharge with resolution of the middle ear. Examination of the throat revealed a markedly congested pharynx, enlarged and reddened tonsils, with the presence of a punctate exudate on both sides. Diagnosis: Acute follicular tonsillitis.

April 26: There was absence of neck rigidity, with a negative Kernig and Babinski. The temperature reached 104.4° , pulse 77, respirations 30. Throat examination showed an increasing exudate. Smear and culture from the exudate was reported streptococcus hemolyticus. The general condition of the patient was about the same. With such a temperature, the beginning of some intracranial complication was constantly borne in mind. But with sufficient cause

in the throat to produce such hyperpyrexia and with the absence of other signs, we felt that there was no need for fear, at least, for the time being.

April 27: The temperature dropped to 101°, and the patient felt much better with the subsidence of the throat symptoms. He asked for food and appeared much brighter. There was presence of the diplopia in the right half of the field and it seemed to cause the patient considerable annoyance.

April 28, 29, 30: During this period the patient rapidly improved. The temperature remained normal and never rose again during his entire stay in the hospital. He slept well, ate heartily and his general condition was better. Ear examination was negative.

At the end of the following week, the patient wished to get out of bed, but in view of the severe injury he had suffered, we thought it best to preclude this for another week. During all this period no change in the abducens paralysis was noted. A beginning convergent strabismus was becoming noticeable at this time.

One week later the patient was permitted out of bed and he left the hospital on May 16, a little less than four weeks after admission to the hospital, fully recovered from his injury, but with persistence of the abducens paralysis.

Shortly after his return home, he reassumed work without any apparent inconvenience or discomfort. We have examined the patient on several occasions since and have observed absolutely no change in his ocular condition. The convergent strabismus is much more pronounced. What the outcome in this case is going to be we are not prepared to say. It is now three months since his original injury and the condition, instead of improving, is becoming progressively worse.

For the privilege of reporting this case we are indebted to Dr. L. A. McClelland, on whose service the patient was admitted.

691 Lafayette Ave.

RADIUM IN CANCER OF THE LARYNX WITH PARTICULAR REFERENCE TO DOSAGE AND THE DANGERS IN ITS EMPLOYMENT.

DR. THOMAS J. HARRIS, New York.

In a recent address before the Pennsylvania Medical Society, Dickinson of Pittsburgh, declared "that an attitude of deepest gloom seems to prevail with the profession and with the public in regard to malignant disease. This is much more marked than it was ten years ago." If this is true, it is due, in his opinion, to abortive propaganda which has been put out in large amount regarding the miraculous effect of a new remedy called radium in the cure of this dread disease. This has resulted in the public and the profession alike delaying until it was too late to make use of the one demonstrated means for a cure, if taken in its incipiency, *i.e.*, surgery. This warning is a timely one. We cannot too often impress upon profession and laity alike that early operation before everything else offers the one ground for a hope for a cure. But as Delavan rightly says in a paper read in 1919 before the American Laryngological Association, "It has for generations been evident that surgery alone, even in patients treated by the best available surgical methods, is in many instances not sufficient to meet the possible demands of the case. The *very atmosphere* of the disease must be attacked. In some cases early diagnosis may be extremely difficult, if not impossible." So any other means in addition to surgery which can be discovered, are urgently needed. Among these, none has attracted greater attention in recent years than radium. Much has been written, both of the physiological and clinical effects of this substance, but we are still greatly in the dark. Every bit of accurate information available in regard to the results obtained from the use of radium in cancer of the larynx is urgently demanded. Most statistics are worthless. Quoting Delavan again, "the word 'cured' can only be truthfully applied when such a disease as cancer, lepra or tuberculosis has been absolutely and permanently eradicated."

The reporting of failures means nothing unless the report states clearly the nature of the growth, the duration and especially the mode of application, dosage, screening and length of application. Nor do reports of successes mean much more when only a few months have elapsed since the application. It is exceedingly gratify-

*Presented at the New York Academy of Medicine, Section on Rhinology and Laryngology, April 26.

ing and encouraging to read of the complete disappearance of a cancerous growth for, say, six months, but as Beck properly declares, five years should elapse before a cure can be pronounced. Until then, the most that can be claimed is retrogression of the growth.

There is general agreement among those who are working with radium that it has demonstrated its great value in cancer of the larynx by relieving pain. There is no discussion in regard to this. The vital question is, does radium *cure* cancer of the larynx, and secondly, in order to do this, is there danger of serious after-results from its employment? The answer at the present time to the first of these questions is difficult, if not, according to the standard of Beck, well-nigh impossible.

Sonnenschein, in an excellent paper before the Section of Otolaryngology of the A. M. A. last year, collected 104 cases of cancer of the larynx treated by radium. Of these, eight were apparently cured, 14 improved and 82 not improved. These statistics by themselves, as we have just stated, mean nothing. In the 82 failures we have no knowledge whether proper dosage was employed, while the 14 improved and 8 apparently cured cases, without fuller and later data, are equally misleading. As in all other fields of surgery, a few cases carefully studied, are worth volumes of empty nothings. The number of such cases in the literature is surprisingly small, considering the amount written on the subject. We have endeavored to obtain from workers with radium such information, but with little success. Dr. Robert Abbe regards cancer of the larynx as well-nigh hopeless for treatment by radium, and apparently has not had a cure. Dr. Field at the Radium Institute, we hope will be here tonight and will speak for himself, but we are under the impression that his results up to date are negative. We can find no encouraging reports in the foreign literature. In Philadelphia at the Jefferson Medical College, some good work has been done by Newcomet, who reports the complete disappearance of the growth in two cases; one for six years and the other for three years. By far the most scientific and careful work with radium has been done at the Memorial Hospital of this city, under the direction of the late Dr. H. H. Janeway. Dr. Janeway, in 1918, stated that he had treated a number of cases of cancer of the larynx with radium, and that all had been greatly improved, but he had cured none, although in several cases the growth had for a time completely disappeared. (May we add in this connection that the early death of such a devoted worker as Dr. Janeway can be regarded as nothing less than a calamity.)

We have been able to collect only the following cases of apparent cures where radium alone was employed:

DELAVAN: Trans. A. L. A., 1917. 2 cases, 1, 2 years; 1, 18 months.

NEWCOMET: Personal communication. 2 cases, 1, 6 years; 1, 3 years.

HALSTED: At the recent meeting of the Eastern Section of the Amer. L. R. & O. Society. 1 case, 1 year.

YANKAUER: Personal communication. 2 cases, 1, 5 years; 1, a few months.

COAKLEY: LARYNGOSCOPE, 1916. 1 case, nearly 5 years; no recurrence, as shown by autopsy.

LYNCH: Trans. A. L. A., 1918. 1 case, 18 months. (A recent letter from Dr. Lynch says this case died a year ago of metastasis after laryngectomy.)

FREER: Cancer of epiglottis and base of tongue. Trans. A. L. A., 1918. 1 case. (At last report, letter from Dr. Freer states there is no recurrence.)

BECK: Personal communication. 1 case. (Exact time since application of radium not stated; at least 18 months.)

A total of 11 cases, of which only 3, so far as the reports state, have gone more than five years. If then out of the large number of cases undoubtedly treated by radium of the larynx, only 11 or less can be regarded as apparently cured, we are confronted with the all important question, What is the explanation for the many failures? Undoubtedly, as Harmon Smith has pointed out, even under the most approved dosage, we must anticipate varying results due to the marked variation in virulence in different cases. The reason, however, is much more deeply seated than this. The controlling factor, as Boggs in a recent article on the subject in the Journal of Radiology (1920) says, is *incompetent therapy*. "There are too many inexperienced operators. The treatment of malignant disease is a specialty in itself. It demands on the part of surgeon and radiologist alike, a comprehensive study and acquaintance with the regions of the growth, the type, duration, mode of extension, etc. It cannot be said positively of any malignant growth that it has not already produced metastasis in the glands."

The mode of the action of radium is now pretty well understood. "There is a cloudy swelling of the nucleus followed by a rupture of the nucleus and a disintegration of the cells. The dead cell is carried off by the phagocytes and out of the system in the urine. A secondary change is an obliterating endarteritis." Tyler, Journal of Radiology, January, 1921. It is essential that the radium, in order to bring about a cure, must produce these two results. For this, it is generally agreed among radiologists, that massive doses are necessary. As Tyler expresses it, "We must kill the growth or the growth will kill the patient." The danger in the treatment of cancer with radio-active substance, lies in the fact that proliferation is enormously stimulated if we cannot destroy all the

pathologic cells. Schmidt, *Journal of Radiology*, January, 1921. The exact dosage of radium in cancer of the larynx is yet to be determined.

It is recognized that the locative is one of the most difficult in the body and that epithelioma is far more resisting to attack than sarcoma. We are confronted not merely with the problem of removing the actual growth, but also of destroying all the cancer cells in the adjacent tissue. Surgery will remove cancer cells, but not change the characteristics of abnormal cells. The eradication of cancer of the uterus so frequently followed by recurrence is, according to Schmidt (*Journal of Radiology*, 1921), "because an auto-vaccination of the cancer cells took place during the operation or vestiges of the tissue of the growth were left." This, in the opinion of some of the best workers in radiology in the country calls for the application of radium combined with Roentgen ray or of radium alone 10 or 14 days before operation, to be repeated as soon as possible after operation. This procedure should apply with equal force to cancer of the larynx. The serious question is whether such massive doses as seem to be demanded are safe. Tyler states that many times he has been told by radium operators that they always produce a burn in the treatment of malignant growths, but that this burn heals quickly. How far this applies to the new field of work in the larynx imperatively demands an answer at the earliest day possible. Human nature is such that few of us care to report unpleasant results. The number of reported cases of burns of the larynx are few. At a recent meeting of this Section, Dr. McKenty reported such a case where only a complete removal of the larynx effected a cure. A second case was indirectly under our care; a man of 77, suffering from epithelioma of the left chord where radium had been applied with no result and later was applied in massive dose with very pronounced reaction, causing marked swelling and dyspnoea, requiring tracheotomy. In this case there was a profound reaction within the larynx, all ascribed by the radiologist to the application of radium. A third case of burn, resulting in death at the end of five years to the case of Coakley, just referred to. Opposed to this statement of Tyler, Beck, in a personal communication, says: "In my early experience with the treatment, I had slight burns and irritation of the skin, but nothing that could be called very distressing to the patient or of any consequence. Since I have learned the technique of screening, I do not have any burns; also, the fact that we use needles directly into the cancer prevents the burning of healthy tissues."

A death has been reported by Dr. Beck of Chicago, from the use of radium. The patient, a man of 47, had been subjected to laryngo fissure. He had received 200 mg. applied to the region of the larynx for 17 hours the day before laryngeal fissure was performed. Then two 125 mg. radium needles were inserted at the line of incision for four hours. Before leaving the table he vomited, a few hours later dyspnoea set in, followed by death 48 hours later—due, in Beck's opinion, to toxemia.

A second death has been reported by McKee following the application of radium. The dose was an intensive one. There was deep abdominal pain, necrosis of the abdominal wall, the skin finally breaking down. He regarded the cause of death to be a deep seated dermatitis.

To arrive at a definite conclusion in regard to dosage, it must be determined among other things, how the radium is to be applied. Many men feel that the external application is worthless. Lynch states that in his case no results were obtained from external applications. Coffin, in two cases reported at the 1917 meeting of the American Laryngological Association, made repeated applications endo-laryngeally without any benefit. Further experience will show whether all cases demand laryngo fissure. Beck, who has altogether used radium in 32 cases of cancer of the larynx, in seven cases without any other measures, is in the habit of using needles introduced in most cases under suspension laryngoscopy. In exceptional cases a laryngo fissure is performed for the purpose of introducing the radium. As the result of the death from radium just referred to, Beck now uses from 50 to 100 mg. of radium for a period of 6 hours, repeating the dose at first every week. We have also to be informed of the comparative value of the element as compared with the emanation. The actual introduction of a needle into a growth in the larynx is far more difficult than elsewhere in the body. Simpson of Chicago, according to Freer, has devised such needle which Freer used in his case of cancer of the epiglottis and base of the tongue.

Up to date, it cannot be claimed that there is sufficient warrant for the substitution of radium where surgery is indicated. Unfortunately, many cases present themselves too late for surgery; here the employment of radium is certainly warrantable. A larger question is the propriety of proceeding and following of surgical methods by the use of radium. Certainly if the present teaching in regard to the growth of cancer cell is correct, it is highly important that mitosis of the cells should be stopped before any possible stimulation can be set up by surgery, and this, radium is able to do.

104 East 40th St.

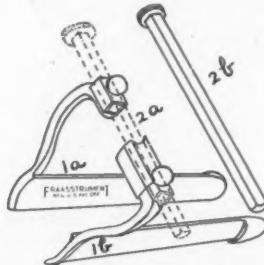
A MODIFIED SEPTUM SPECULUM.

DR. GEO. D. WOLF, New York City.

Probably the most essential instrument used in the operative correction of a deviation of the nasal septum is the septum speculum. This instrument is of the utmost importance, for without a clear view of the operative field, serious trauma is more than likely to result.

To those, then, who, like the writer, are in the habit of using a septum speculum after the perichondrium and mucous membrane have been elevated, the instrument described below may be advantageously employed.

When one encounters a markedly deflected septum, especially one of the sigmoid type, or one with large spurs, the introduction of both blades of the commonly used speculi is sometimes a very difficult



matter and may occasionally be done at the expense of at least a unilateral perforation of the septal mucosa. It is on account of this that the principle of obstetric forceps, *i.e.*, the introduction of one blade at a time, was considered the correct surgical procedure, and it is with this view in mind that the instrument was constructed.

Briefly speaking, it consists of two solid blades (1a and 1b) and sliding bar (2a and 2b), which support them.*

After the primary incision has been made, and after the septum has been well separated on either side, it is the author's custom to introduce the blades of his speculum separately; to temporarily lock them, and after a thorough examination of both nares, to convince himself that the speculum is in good position, then to introduce the

*2b is same as 2a, shown separately.

bar of the instrument (2a) and to separate the blades to the desired distance, and then to proceed with the operative correction of the septal deviation.

At the conclusion of the operation, and when one is ready for the packing, the same instrument may be used for the protection of the nasal mucosa from any further trauma, as well as to help better approximation of the cut edges, by introducing the speculum in the above described manner on the outside of the septal mucosa, and after the packing is completed, and removing the instrument gently, while the packing is held back by the index and middle fingers.

This instrument may be obtained from Aug E. Fraass Co., Inc., 1261 Broadway, New York City.

The advantages claimed for it are:

1. One blade can be introduced at a time, thus lessening the danger of perforation.
2. If, after adjusting the instrument, one blade should be found to have gone through the mucosa, this alone can be removed and re-applied without disturbing the other blade.
3. It is extremely simple in construction, not having any adjusting screws or springs, and still possesses any desired degree of accuracy.

815 Park Avenue.

AN IMPROVED HEAD LAMP.

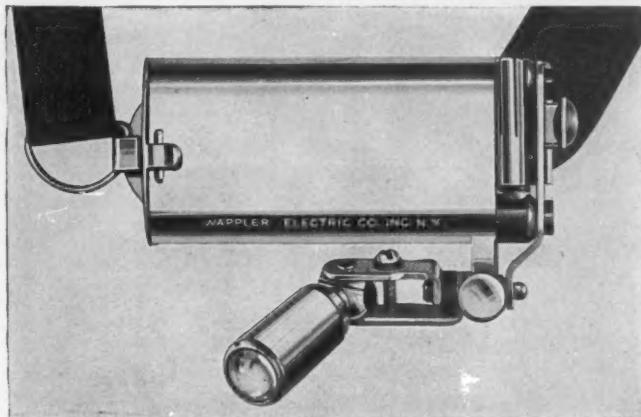
DR. HAROLD M. HAYS, New York City.

The head lamp, here pictured, almost explains itself. It has a number of advantages over the usual electric head lamp, which may be enumerated as follows: Its lower price, the batteries and lamps can be purchased at any store dealing in electric goods; it gives a good light, either with the dry cell battery or by attaching wires from it to a rheostat, and lastly, the electric bulb can be unscrewed and the battery can be used for lighting the small lamps attached to a nasopharyngoscope, proctoscope or urethroscope.

The main portion of the instrument consists of a cylindrical holder for a small two-celled battery which is mounted on a head-band

(of elastic) so that when the instrument is placed on the head, the battery casing is in the center of the forehead. To the lower portion of the battery case is a ball and socket arrangement, holding the bulb, which can be turned in any direction. The bulb is covered with a condensor which allows of a particularly sharp light at any distance. To one side of the battery casing is an especially adapted rheostat.

For ordinary examinations the dry battery may be used, but for operations a permanent light is preferred. To one side of the



battery casing and above it are two receptacles for the insertion of the wires to a rheostat. These are properly attached and the requisite amount of current turned on. Meanwhile the dry battery is not being used. In the same way the wires may be attached to any of the small lamps on diagnostic instruments (at the same time turning off the bulb on the instrument) and by means of the rheostat on the side of the battery casing one can get ample illumination.

2178 Broadway.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

March 23, 1921.

Lymphatic Leukemia with Proliferation of Lymphoid Tissue in Tonsil and Adenoid Regions. Dr. M. N. Jasper (By invitation).

The patient, 37 years of age, a painter by occupation, stated that he had never been sick in his life. He came to the Clinic on August 11, 1920, because his speech was a little thick, and was admitted as a case of hypertrophied tonsil. On September 10, a large tonsil was removed, which weighed 15 grams, or half an ounce. A section was examined and reported to be normal tonsil tissue. He reported for two or three post-operative inspections and was discharged as cured. On February 2, 1921, he returned, complaining of difficulty in swallowing and breathing. Examination showed a large mass spreading from the region of the lingual tonsil into the tonsillar fossae. He also had a mass hanging from the naso-pharynx on the left side. It appeared as though the tonsil had not been removed, and some systemic condition was suspected.

The blood count of February 2 was 3,000,000 r.b.c. per c.m.m., 40,800 leucocytes; small lymphocytes, 39 per cent; large mononuclears, 50 per cent; polymorphonuclears, 10 per cent; eosinophiles, 5 per cent; hemoglobin, 68 per cent.

Physical examination showed no enlargement of the spleen, but a very large node in each axilla and in the supra-clavicular region on the right side, and large inguinal and cervical nodes. He was put under X-ray treatment on February 23, and after four treatments the large mass in the naso-pharynx had almost entirely disappeared and the mass in the lingual and tonsillar regions had diminished greatly. The blood examination at this time was: r.b.c., 3,580,000; leucocytes, 32,300; small lymphocytes, 68 per cent; large mononuclears, 20 per cent; polymorphonuclears, 12 per cent; eosinophiles, none; hemoglobin, 65 per cent.

Examination March 23, 1921: r.b.c., 3,920,000; white cells, 14,800; poly. He feels much better, but is not yet able to work. There is still a small mass hanging from the naso-pharynx, but not nearly so large as at first. The prognosis, however, is rather doubtful; he may recover completely, but may relapse at any time.

The case emphasizes the importance of the blood examination in cases of recurrence of the tonsil after complete removal.

Spontaneous Cure of Malignancy of the Throat, With Involvement of Opposite Side One Year Later. Dr. L. M. Hurd.

This man was 64 years of age when first seen in July, 1919. The previous February he had had a glandular enlargement, following some trouble around the tooth. In June, he had nasal obstruction and deafness in the right ear, and some pain. When seen in July, he had a large mass in the neck; the tonsil itself was enlarged; there was also a mass on the lateral pharyngeal wall running up and crowding over, practically occluding the naso-pharynx. The Eustachian tube was closed off and he suffered from deafness, pain and a bloody discharge from the nose and mouth. The tonsil was about an inch and a half by an inch in size. He had been to the Crocker laboratory and elsewhere, and someone had taken a section from his throat, which meant nothing, as it had not gone deep enough. The condition seemed to be malignant and hopeless, and the patient passed from observation.

Remarkable to say, March 16, 1920, he returned. Examination showed some infiltration of the fold and lateral pharyngeal wall and the gland in front of the fold, and the gland in front of the tragus and a few small

glands in the angle of the jaw. In June, he had gotten to a point where there was no infiltration in the throat, but he still had a little infiltration of the lymph gland that drains the tonsil in the throat; just a small emorphonuclears, 16; small lymphocytes, 66; large lymphocytes, 18. enlargement.

In October, the left side began to swell on the outside and just a little internally, and it has been getting larger since. He has had two radium packs. The facial paralysis now exhibited came on last week. He has had six X-ray treatments.

He is now under treatment at the Memorial Hospital. The lateral pharyngeal wall is now pushed into the median line. The gland on the left side was taken out by Dr. Adrian Lambert and pronounced to be lymphosarcoma by Dr. Ewing.

Dr. Hurd said he had read of spontaneous cures, but had never seen one before. There was no doubt that this man had some clinical condition on the right side which had entirely disappeared, and now had developed a similar condition on the other side. He really seemed to have been made worse by the X-ray treatment.

Laryngectomy. Dr. Hurd.

This man, 48 years of age, complained of hoarseness for five months before coming under observation in April, 1920. This gradually grew worse, and when first seen he had slight pain on coughing, referred to the left ear. There was no dysphagia, no dyspnoea, no loss of weight. The Wassermann reaction was negative. There was a growth in the larynx, in the anterior commissure and under the left cord. The left cord was fixed, the arytenoids movable. The growth involved the subglottic area mainly to the left side. There were no glands palpable.

On April 5, a low tracheotomy was performed. On April 14, under colonic anesthesia, a laryngectomy was performed and the growth was removed. It had just begun to infiltrate and rupture through the cricothyroid membrane. The muscles about this area were removed and the patient made a fairly good recovery, excepting that about that time he was laid up for a while, and those in charge of the case continued to feed him through the wound, and the esophageal fistula persisted until November, when it was closed under novocain and healed by primary union.

Dr. Hurd said he wished to present the case as one that had not had any radium treatment.

DISCUSSION.

DR. HAYS cited an interesting case seen some years previously, in which a diagnosis of sarcoma was made. The patient, a man, had started in with an acute condition which simulated a retro-tonsillar abscess. This was incised and there was an enormous amount of bleeding, but no pus. A day or so later he complained of great pain and a number of incisions were made with no result, and finally a consultation resulted in a consensus of opinion that the condition was a rapidly growing sarcoma, with an acute inflammatory condition and that the prognosis was very bad. The man returned home to Montreal. A section which had been made was reported by two laboratories to be an acute inflammatory condition. That was some years ago, and the man has had no recurrence.

Dr. Hays said that many of these acute conditions are seen in the throat, some of them associated with acute inflammatory reactions which arouse the suspicion of malignancy, and the only way to determine what they are is to remove a section.

DR. KAHN said that seven or eight years ago he had seen a case in a child six or seven years of age, who had had typhoid fever. After it had recovered and was up for a couple of weeks, a leukemic condition came on, with an enlargement of all the lymphoid tissue throughout the body. There were repeated bleedings from the pharyngeal and adenoid regions, and this was followed by a breaking down of the adenoid tissue, resulting in a large sloughing in the post-nasal region. The child eventually died. The blood showed a true leukemic condition.

Referring to Dr. Hurd's case of spontaneous cure of malignancy, Dr. Kahn said he had recently seen in Cleveland a young girl, 15 years of age, who had been operated upon for enlarged cervical glands of the right side. These were examined by several pathologists and conflicting reports were returned, some stating them to be malignant; others, not. The case had been operated upon by a prominent surgeon and a facial paralysis followed the operation. That was some years ago and there had been no recurrence since. Where the lymphoid tissues are involved the pathologists should be very careful in making a report, and often in sending a specimen they should know the history of the case.

DR. WILSON said that some fifteen years ago he had seen a case similar to Dr. Jasper's, a woman who had much difficulty in breathing, and the tonsils were removed. The spleen, however, was way over on the right side, and she died a year later.

DR. IMPERATORI told of a new apparatus which had been devised in Germany and brought to this country by Dr. Sittenfield. It was originally designed for the application of X-ray to the uterus, not the larynx, and with it they had been able to focus the rays on the part involved and thereby give a massive intensive dose. He had attended a general medical meeting where Dr. Sittenfield had spoken of this particular method of treatment and had reported some wonderful cures. The doctor was now trying this out on one of his own cases, which he hoped to be able to report at a subsequent meeting.

Report of Case of Cavernous Sinus Thrombosis Following Folliculitis of the Nares. Dr. L. M. Hurd.

Male, about forty.

Nothing of interest in previous history except excessive use of tobacco, alcohol and formerly morphin, which would lead one to believe that his constitutional resistance was undermined.

While playing golf on Sunday, felt a soreness in the end of his nose. He did a little picking on his own account and on Monday a follicle was opened on the right side of the septum well forward in the vestibule. Again opened on Tuesday.

I saw him first on Wednesday afternoon, at which time his temperature was 102° . The end of his nose and upper lip were very red and greatly swollen, the discoloration of the swelling running about half way up the dorsal of the nose. Slight headache. At this time there were three small openings through follicles through which pus was exuding.

Free incision made on the right side of the septum extending well forward and back one-half inch. A large piece of necrotic tissue was removed with suction.

Next morning sent in to the hospital. In his nose the swelling and redness had reduced about half. Blood taken for culture. That afternoon his temperature had reached 104.3° . His nose and lip had doubled in size and extended further up on the nose. There was no edema of the lids or conjunctiva. He was taken to the operating room and freely incised through the septum and the vestibule from the cul de sac backward to the nasal floor on both sides, and under the upper lip incision was extended through the floor of the nose. No pus was encountered, only some more necrotic tissue.

The next day his temperature had continued high and in the afternoon both eyes were closed and intense edema of the lids and conjunctiva, and the swelling had extended down the neck, and the skin over the face was purple. He was in a comatose state and died that night about ten o'clock.

The blood culture showed staphylococcus albus.

Cavernous Sinus Thrombosis, With Improvement of Symptoms. Dr. Norton L. Wilson.

Mary S., age 9 years, entered the hospital January 17, 1921, with a history of having fallen upon her nose two days before. There was a

dirty wound present at the root of the nose and a little to the left side. The left eye was edematous and red (cellulitis), and there was a subconjunctival hemorrhage present. The next day the eye was protruding, and the patient had a temperature of 103°. On January 19, the blood culture grew diplococcus and some chains; 1800 whites, and 90 per cent. polynuclears. On January 21, the lower lid was incised and some pus was evacuated. The exophthalmos subsided, but it was noted that the patient had a paralysis of the superior rectus and external rectus. The temperature ranged from 99° to 102° until January 22, when it shot up to 104°. On this date another blood culture showed a diplococcus, with 20,000 whites and 92 per cent polys. The temperature declined until February 8, when it shot up to 104°. On February 27, the third nerve paralysis almost entirely disappeared and the sixth nerve paralysis was decidedly improved. X-ray picture of the sphenoid and ethmoid was normal. On March 6, there developed a marked nystagmus when looking upward and outward. On March 9, the nystagmus disappeared. On March 15, the patient suddenly died, two months from the time of injury. The autopsy revealed a cavernous sinus on the left side, filled with pus containing same organism as previously found in blood, with abscess in cerebro pontine angle.

I have seen seven of these cases, but never saw one get well, and never before saw one live more than two weeks. This case ran on for two months, and finally developed an abscess in the brain and died. I had hoped to be able to present the patient here.

DISCUSSION.

DR. A. KAHN inquired how Dr. Hurd had reached the diagnosis of cavernous sinus thrombosis, and also how Dr. Wilson accounted for the cavernous sinus thrombosis in his case, and why there was a nystagmus.

DR. THEODOR BLUM said that within the last nine months he had seen two cases of sinus thrombosis, both of dental origin, one of the patients being a man of 65 who had had a tooth removed from the lower jaw. When seen, he was quite septic and there was a marked cellulitis of the left side of the neck. He developed an edema of the eye on the left side; where the tooth was taken out, and then of the right side, and died within a week after the case was diagnosed. The other case was that of a little girl, 4 years old, who was admitted to Bellevue Hospital in a septic condition with a history of having had some lower teeth attended to on the left side. When seen she had an ordinary cellulitis on the left side of the neck near where the dental work had been performed, but nothing to lead anyone to believe that a cavernous sinus thrombosis would follow. A few days later when he again saw her in the surgical ward, it was noticed that both eyelids were swollen and she had a temperature of 106°, with a rapid pulse, but no diagnosis had been made by the surgical staff, although they suspected meningitis.

Fortunately an autopsy was permitted, and while the meninges at the base showed pus, that was secondary to the involvement of the cavernous sinus, which, when opened, was found to be obliterated by the accumulation of pus.

DR. ABRAHAM told of a case seen last year in consultation with an eye specialist. The patient was a child of five with a temperature of 106°, an exophthalmos on the right side, a profuse nasal discharge and symptoms of meningeal irritation, and was comatose. The prognosis was very grave, and owing to the sinus complication, it was thought best to make an incision through the conjunctiva, but no pus was found. Dr. Abraham said he then suggested an incision through the inner angle of the lid internally, in the direction of the ethmoid cells. This was done, and the fluid and pus evacuated showed a staphylococcus infection. He then suggested an ethmoidectomy, which was performed, but the child died of a cavernous sinus thrombosis.

DR. W. W. CANTER told of a case seen last year in Gouverneur Hospital. The patient was a little boy of five, who had been operated upon by a general surgeon who was trying to find pus in the orbital cavity. The

child had a marked exophthalmos, and the surgeon had made an incision through the upper eyelid, with the expectation of finding pus, but, of course, had failed to find any. The condition in the nose was a marked ethmoiditis, and the cavernous sinus thrombosis was doubtless due to the ethmoiditis. There was also ulceration of the cornea on the affected side. It seemed probable that the condition had existed for some time before the child was admitted to the hospital. The boy died a few days later. No autopsy was permitted, but it was unquestionably a case of cavernous sinus thrombosis.

DR. HURD, replying to Dr. Kahn's inquiry about the diagnosis, said that the diagnosis was made on the basis of the edema of the conjunctiva and the swelling of the lids. When the lid was lifted one could see that the venous blood was shut off. He had presented the case to direct attention to the fact that a folliculitis of the nares may sometimes have a very dangerous sequence. In his opinion it was very bad surgery to incise these cases, and if done, a very small incision should be made in the infiltrated area and suction used, to prevent if possible the infection from rushing up through the veins and getting into the sinus. This was a very fulminating case.

DR. WILSON, referring to Dr. Kahn's inquiry about the nystagmus, said that when it appeared, of course, a brain abscess was suspected, but it only lasted three days. After that he had been called out west and the doctor who was looking after the case thought the child was really making a recovery, as he also had thought when he left. The chart itself, with the blood examinations, showed very clearly what was going on. The explanation seemed to be that there must have been a clot in the cavernous sinus, lying between the third and sixth nerves. That cleared up and did not extend around the circle to the other cavernous sinus. He had thought that this was the first cavernous sinus case he had ever seen that was going to get well. He could not understand why the nystagmus had cleared up, or why it was of the character shown. In fact, he had not absolutely decided that it was an abscess in the cerebellum.

Secondary Tonsillar Hemorrhage With Anaphylaxis, Due to the Administration of Horse Serum. DR. L. D. Alexander, Jr.

Mrs. S., 49 years old, married, and weighing 210 pounds, was admitted to the hospital November 14, 1920, with a history of rheumatism and sciatica, and frequent attacks of tonsillitis. The urine showed hyaline and granular casts and a trace of albumin. Her blood pressure was 140. Examination of the throat showed large submerged tonsils with extensive plica.

On November 21, 1920, the tonsils were removed under ether by means of blunt dissection. There were no complications during the operation. The following day the patient had an attack of sciatica, which yielded to treatment on the fourth day. The patient was discharged on the fifth day, with the throat healing.

On the seventh day, at 7:30 P. M., after a family argument, the patient coughed up blood, followed by a free hemorrhage. Examination of the throat at 8 P. M. revealed blood oozing persistently from low down in the left tonsillar fossa. The usual attempts to check bleeding were resorted to,—pressure, adrenalin, bismuth, silver nitrate, Monsell's solution and morphin—but all efforts to localize the bleeding and clamp the vessel were unavailing. About midnight, an ampoule of coagulose was administered subcutaneously. After this, the blood clotted perfectly, becoming thick and tarry in consistency. At 2 A. M., another ampoule of thrombo-plastin was given, with further blood clotting, but the oozing continued. At 7 A. M., the patient was removed to the hospital. At 3 P. M., anesthesia was given, and with the aid of Dr. Aitken's three bleeding points—two in the posterior pillar and one at the site of the attachment of the plica—were clamped and ligated. The patient had no further bleeding and was returned home with a nurse on the fifth day.

On the seventh day following the secondary hemorrhage the patient had an acute anaphylactic attack, with vomiting and diarrhoea, and became

pulseless. This was followed by a rapid rise of temperature to 105°, and an urticaria from scalp to feet. Stimulants and adrenalin controlled the attack.

On the fourteenth day she had a slight hemorrhage from the left tonsillar fossa, with breaking away of a ligature. The hemorrhage stopped spontaneously after an iced gargle. Since that time the patient has had some urticarial eruption, with areas of tingling and extreme itching. The blood examination, two days after the secondary hemorrhage, showed hemoglobin 82 per cent and r.b.c. 4,400,000.

This unhappy experience with horse serum led me to seek advice as to a method of preventing a similar one. I consulted Dr. Albert Vander Veer, Jr., who advised me as follows:

"All cases which receive horse serum injection should first be tested to see if they are sensitive to horse serum. Take normal horse serum and dilute it ten times with normal salt solution (this solution will last a year or more). Inject a very small amount (1/100 cc. or less) into the skin, so that it raises a wheal of $\frac{1}{4}$ -inch in diameter. If the patient is sensitive, you will get a typical reaction in five to ten minutes. Should the reaction be severe in super-sensitive persons, possibly causing an attack of asthma or urticaria, an injection of 0.5 cc. of adrenalin chlorid should be used to control it."

In view of my nearly fatal experience in this case, I feel that this testing should always precede the use of horse serum or its derivatives whenever they are used in a case of hemorrhage, and that the manufacturers of these products should so advise in the literature which they furnish when dispensing these products.

DISCUSSION.

DR. GOTTLIEB said that he understood that Dr. Alexander injected coagulose at one time and thrombo-plastin at another. In neither of these is horse serum contained. Coagulose is a suspension of the blood platelets of the horse. They are not supposed to contain horse serum. Thrombo-plastin consists of deep pains suspended in normal saline which have been sterilized and some other antiseptic added to keep it fresh.

Referring to the suggestion made in regard to testing these patients out by injecting into the skin a dilution of horse serum, Dr. Gottlieb said it is easier to make a superficial scratch and then apply plain undiluted horse serum, and one will get just as good results without the danger of allergic symptoms developing.

DR. LEDERMAN said that some years ago he had reported a case of hemorrhage following the removal of a large fibromyxoma of the ear in a female, with a haemophilic history. The operation was performed under local anesthesia at the office, but the patient was advised that should anything occur, she would have to go to the hospital and be looked after. Prior to the operation she had been placed on calcium lactate, on account of her history. For a brief period after the removal of the fibro-polyp, no bleeding occurred, and then suddenly a little oozing appeared. After repeated attempts to stop this by packing and local applications without success, 10 cc. of horse serum was administered, and in about twenty to thirty seconds the hemorrhage ceased. Fearing a repetition of the bleeding, however, she was sent to the Polyclinic Hospital. When seen the next day she had an extensive urticarial attack, but no other indication of a serious nature except a slight temperature. The wheals lasted for five or six days, and gradually disappeared. They were hemorrhagic in character from two to three inches in area, and appeared at the arms and thighs.

DR. HAYS said that in a recent case of nasal hemorrhage he had injected the patient with horse serum and six days later she had a terrific anaphylaxis. At that time someone had given him the suggestion that if you will inject one or two cc. of the serum and then wait two hours and give a larger dose you will not have an anaphylaxis.

DR. ABRAHAM said that in the last two months he had operated upon two cases of hemophilia, proven by blood coagulation tests and clinical

history. The first patient was a man of 36, who, two years previously had had a nasal operation performed and bled for four days following removal of the packing. His blood coagulation time was 18 minutes; his kidneys and other organs were in good condition. Two days previous to the operation he was transfused with 500 cc. of blood, which reduced the blood clotting time to 14 minutes. The following day he was again transfused, from another donor, receiving 700 cc. of blood, which reduced the blood coagulation time to 7 minutes. It was then thought safe to remove the tonsils, so the following day he was operated upon and a surprisingly marked hemorrhage occurred, requiring about ten ligatures to control it. After that time the patient did well until the fourth night, when oozing started up about midnight, and he was called in to control it. On the left pillar he found capillary oozing, requiring two sutures to control the hemorrhage. One cc. of aseptic ergot and morphia was administered hypodermically; adrenalin and thrombo-plastin had been applied locally and had failed to check the oozing. Without further complication, the patient made a very successful recovery.

In the other case the patient was a girl of twenty. Her blood clotting time was 14 minutes, and no transfusion was given. She was operated upon, and at the time of operation six ligatures were required to control the hemorrhage. A week later he was called in to see her on account of oozing from the left side. At this time he did not put in any ligatures, but again ergot and morphia were used hypodermically; locally, thrombo-plastin and ephrineprin. This successfully checked the oozing.

DR. WILSON remarked that the blood clotting time was diminished, but the patients continued to bleed just the same.

DR. GOTTLIEB said that it might be well to remember in cases of hemorrhage, instead of using horse serum, if one should take 20 cc. of blood from another member of the family and inject it into the buttock the desired effect might be secured without any of these annoying or dangerous symptoms. The material is ready at hand without any great trouble. He stated that he had followed this method himself and had never had any of the trouble which many men had reported with the use of horse serum.

DR. CARTER said it was important to remember that the occurrence of hemorrhage and its stoppage were far more depended upon the condition of the walls of the capillaries, arterioles and arteries than upon the condition of the blood itself. No matter how short the clotting time, if there is an open blood vessel it will continue to bleed until the muscular coats of the blood vessel have closed it. The blood clotting time does not have such a great deal to do with the stopping of the hemorrhage, certainly not when it occurs from the arteries and arterioles.

DR. A. KAHN said that in his opinion the subject of anaphylaxis was very much over-estimated. Anyone who had much experience with the proteins would be very apt to get an anaphylaxis with any of them, and anyone who used blood serum would have had such experience. He had heard men of vast experience with diphtheria antitoxin declare that the question of anaphylaxis was much over-estimated.

DR. IMPERATORI said it would seem, that so far as anaphylaxis was concerned, any foreign protein substance would act as described by Dr. Alexander. He agreed with Dr. Wilson and Dr. Carter in what they had said regarding the blood vessel walls. As for Dr. Freudenthal's case, he understood that the patient died.

DR. HAYS said that the blood clotting time had failed many times in tonsil work. One tries to be hyperscientific and takes the coagulation time, and then gets scared off from operating. He had himself tried all sorts of coagulation tests and found that they vary much, according to the time the test is taken and how the individual is feeling, and the operator must exercise his judgment in each case. He then cited the case of a patient whose coagulation time was 12 minutes and he feared to operate. An attempt was made to get it down, and finally, instead of taking the blood from a prick of the finger, one or two cc. were taken from a vein, and much to his surprise it was 5 minutes instead of 12.

The more he had tried coagulation tests the more convinced he felt that it was up to his judgment whether patients should be operated or not.

Everyone knew that Dr. Abraham was very careful in his tonsil work. Dr. Hays said he had seen many of his cases and they were very beautiful, but he sometimes wondered whether the traumatism caused by the sutures, even when put in with much care, did not give a tendency to hemorrhage later on.

DR. ABRAHAM said he knew before he operated on the patients that they were bleeders. Dr. Hays had brought out a point he wished to emphasize on the first case: the patient did not ooze until the fourth day following the operation, and that he attributed entirely to the placing of the ligatures. At the time of operation the bleeding was so profuse that it was most difficult to locate and apply the sutures. Furthermore, he claimed that he thought he had as few cases of secondary hemorrhage as any one, due entirely to his careful control of bleeding by ligatures at the time of operation, in all cases. The second patient also was known to be a bleeder; she had bled for three days after a tooth was extracted. After the operation, however, she did not bleed until the seventh day, and then the bleeding was rather slight. He had mentioned the use of ergot and morphia in these cases.

With reference to traumatism, he did not know of any case he had operated upon where there had been traumatism in applying the ligatures, since they are applied to the bleeding points with care, so as not to include any other tissues. He never sutures the pillars together and rarely resorts to the use of a needle; this undoubtedly accounts for there being so little traumatism in his cases. It requires experience, patience and dexterity before one can successfully apply the ligatures.

Primary Adeno-Carcinoma of the Bronchus. C: J. Imperatori, M.D.

(To be published in full in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. QUINLAN said he could not allow this case to pass without a word of congratulation. The bronchoscope opened up many avenues of observation, but the unusual history submitted by Dr. Imperatori and his careful analytical inquiry into every detail deserved our highest commendation. Such a mixture of malignant and tubercular conditions in the lung was not altogether unique, for sometimes these manifestations did occur; but it was nevertheless strange that a case of miliary tuberculosis which caused caseous degeneration should not have given some evidence in the sputum from time to time. The specimen shown was a very remarkable one, and our thanks are due to Dr. Imperatori for his brilliant handling of the case. The endoscopic picture must have shown even more than the specimen presented here tonight.

Rupture of Esophagus from Foreign Body (Toothplate). Dr. J. D. Kernan.

The foreign body in question had a rather sharp, long hook, and the injury to the esophagus was rather a cut than a rupture. Eight days before coming under observation the patient, James O'C., had swallowed his false teeth during a drinking bout and since then had been unable to swallow. The X-ray examination showed a large plate between the fourth and fifth dorsal vertebra, just beyond the reach of Jackson's large esophageal speculum. Under ether anesthesia the foreign body was easily exposed with the broad end upward, so that it could not be easily withdrawn with any justifiable traction. Looking down into the esophagoscope one could easily see the black walls of the cavity and there was a very foul smell, suggesting that the esophageal wall was already greatly diseased and weak.

The next day a second attempt was made with Mosher's esophagoscope and the foreign body was cracked in two with a large forceps and then easily removed. The patient died, however, twelve hours after the operation.

The autopsy showed emphyema in the tissues of the anterior mediastinum and a small amount of pleuritic fluid in the pleura and pericar-

dium. There was a rupture of the esophageal wall on the right side, about 20 cm. from the teeth. In this location a considerable amount of wall had sloughed away and the wound of the esophagus communicated with a large pocket, extra-esophageal, the walls of which were black and gangrenous. There was likewise a sloughed area in the lateral wall of the esophagus. The presence of this pocket explained the alternating appearance and disappearance of the teeth when viewed through the esophagoscope, as it was evident the teeth would fall into this recess and later be forced out again.

An interesting point so far as the withdrawal of the foreign body is concerned is the importance of having on hand biting forceps for the removal of large, sharp pieces. A large foreign body stretching the esophagus can cause gangrene, even where there is no trauma to help it on.

Dr. Imperatori said that all esophageal foreign body cases must be considered by themselves.

It would seem, however, that if a Mosher ballooning esophagoscope had been used at first, one would have been better able to examine the wall of the esophagus.

It would seem that Dr. Kernan did not know until the second examination that the tissues were traumatised and undergoing pressure necrosis.

It is a question whether or not esophagoscopy should have been done at all; it would seem that an external lateral esophagotomy was indicated after it was known that the esophagus was ruptured. The mediastinum was never intended to be invaded by infection; when it does occur the ending is usually sad.

Had the case been my own I would have used the Mosher esophagoscope with the window and ballooned the tissue away from the foreign body. Then with a cutting forceps, either those that cut from below upward or the cutting forceps described by Mackenzie in his new book, that cut like a pair of scissors, the tooth plate could be broken. In this way the tooth plate could be broken up and removed piece meal. This would have been the procedure at the first sitting. In such a case as this, should one use traction, he may get the foreign body, but lose the patient.

In Dr. Mackenzie's new book he makes the statement in large type: "Do not use a coin catcher and do not search blindly. There are more fatal endings from these methods than from leaving the foreign body alone," or words to that effect.

Of course, Jackson has called attention to this fact since the use of endoscopy.

A Modified Souder Tonsil Enucleator.

DR. JONES said that in looking over the result of eighteen operations at the Manhattan, he had observed a tendency to leave the lower pole, and in teaching the students he had noted the same difficulty, and in order to overcome this tendency he had tried to devise an instrument which would obviate that fault.

A Direct View, Self-Retaining Laryngoscope. (Demonstration on Patient.) Presented by Dr. Max Unger.

(Published in full in this issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. IMPERATORI congratulated Dr. Gottlieb on presenting such a subject so briefly and thoroughly.

DR. GOTTLIEB, referring to Dr. Scheuer's remarks, said he did not believe these were hay fever cases at all, but that they were probably cases of vasomotor rhinitis due to some bacterial condition, and that the results he had gotten were remarkably satisfactory. No one else who was doing his work could boast of as good results. He did not, however, wish to give the impression that the symptoms from which these patients were suffering would not return. They apparently had not been tested out as to their sensitiveness to things that are floating in the air or were taking, and no constructive work had been done to make the diagnosis.

SECTION ON OTOTOLOGY.

April 8, 1921.

Scope of the League's Work, Past and Present. Annetta W. Peck, Executive Secretary.

Last year, when we were invited to appear before the Section, we felt that the ultimate honor had been done us, but to have you as our guests really exceeds our imaginings and, we feel, has set a new standard and extended the leadership among organizations of this type, which we already hold. Indeed, while the teacher of lip reading, the social worker, and the otologist must always work together, we believe that one of the main reasons why the New York League leads the world of social work for the deafened it is the fact that the otologists of New York work so closely with us. In our daily work we depend constantly upon the advice of our Consulting Board of Otologists and upon the guidance of our President, Dr. Hays, and our First Vice-President, Dr. Phillips. We long to enlist all of you to help every down and out you send us and to have associated with us all of your patients who are deafened. They need us and we need them.

We started ten years ago in a school of lip reading. Our founder, Edward B. Nitchie, was a man of broad vision who foresaw our great scope, and it was he who induced Dr. Hays to join us. In those days there was no lip reading in the evening schools, no employment bureaus for the handicapped, and our first work was to give free scholarships in lip reading to help deafened people to earn their living. We have reached a membership of over 800, and last month our attendance amounted to 1425, nearly double that of March, 1920. In March, 1921, we gave 261 office interviews on every subject related to deafness.

We work closely with the City Department of Education, the Metropolitan Museum of Art, the Nitchie School of Lip Reading and Miss Dugane's School. The principals of these two schools are with us this evening. Our Annex of Public School No. 32 holds free lip reading classes in our rooms.

We have with us tonight, as well, prominent officials of the seven leading manufacturers of hearing devices: Harper Oraphone Co., Globe Phone Mfg. Co., Dictograph Products Corp., Port-O-Phone Corp., Mears Ear Phone Co., Gem Ear Phone Co., E. B. Meyrowitz, Inc., who will show you their latest inventions and improvements.

Our social work is divided into four departments, three of which are in charge of staff workers. Our four social workers are all hard of hearing and three of us began as volunteers. Our departments are: educational, employment, welfare, industrial, the latter operating our Hand-work Shop, which sells work to the value of \$1500.00 a year.

This season we have started a mending department, a free practice department for lip-reading students, a thrift shop, the first and only auditorium in the United States fully equipped with church 'phones donated by the Globe 'Phone Company, the Harper Oraphone Company and the Dictograph Products Corp., for lectures and meetings such as this evening's, a brass band, and we are holding the first lip reading tournament in this country on April 29 for the metropolitan championship, in which teams from Manhattan, Brooklyn, Newark and Jersey City will compete for a prize.

Having enumerated our attractions, let me present the staff workers, Miss Samuelson and Miss Lehmann, Employment Head and Placement Secretary, and Miss Cooper, head of the Welfare Department. Miss Walker, who comes next on the programme, is known to many of you through her years of successful lecturing to lip readers at the Metropolitan Museum. Our Museum is the only one in the country which has these lectures, and we are proud that a member of our Board of Directors and head of our Educational Department is the lecturer.

Educational Department: Its History and Scope. Demonstration of Its Work. Jane B. Walker, Head.

Our organization was founded ten years ago by the head of a large school of lip-reading. It followed naturally that his main object in organizing the League was to do educational work among the deafened—more specifically and immediately to provide scholarships for those unable to pay the fees asked by the private schools. It will be seen, then, that the Educational Department is the oldest department of the League, and I may add, the only department whose work at the present time is being carried solely by volunteers.

During our first year we granted eleven scholarships. Since that time there has been a steady decrease in applications. This we attribute to the fact that classes in lip reading are held in the public schools of New York, Brooklyn, Newark and Jersey City, and also that some assistance is given to the needy deafened by the private schools.

The department co-operates with the public school work. Our rooms are used three evenings weekly by the classes of Public School 32. Our members are the instructors, and from time to time lectures are given before these classes by those who do work of the kind. Many applicants to the League are directed to the public school classes.

Five months ago we established a Practice Department which is, I believe, unique among the organizations doing work for the deafened. The object of this department is to supplement the regular, formal instruction given in private and public schools. Since its establishment, 336 hours of practice have been given, which means that 336 times some one has volunteered her time and thought to a fellow traveler on the road of silence.

The department conducts, also, two clubs where practice in lip reading may be had but the clubs are intended to serve another purpose as well, namely, that of enriching the lives of the members. No one knows better than ourselves what dearth of intellectual and spiritual stimulus exists in the lives of great numbers of the deafened. No one knows better than we how difficult it is to hold normal social relationships with our fellow beings nor how insuperable at times seems the task of finding help through contact with other minds and other lives. Often books seem to be our only medium. The opportunity and the ability to earn a livelihood are unquestionably vital. But man cannot live by bread alone.

Our Friday Study Club has an average attendance of between forty and fifty. Its members come from New Rochelle, Brooklyn, Hackensack, Elizabeth and all parts of New York. Their enthusiasm and faithfulness are the best demonstration of the success of this work. The same may be said of the Sunday Inspirational Meetings. Here the object is more definitely to give spiritual food, without which life is so barren a thing. The meetings, which take place twice a month, are non-sectarian, and are conducted by the members. At present we have a small nucleus, but we believe that the earnestness and loyalty of this group will lead to something permanent and vital in the lives of our members.

The present achievement of the department, it will be seen, is largely along lines of inspiring, stimulating and educating one another.

For future work two great untilled fields lie before us. First, the education of the public to a recognition of the seriousness of the handicap of deafness and a full realization of the needs of the deafened man and woman, social, economic, educational and spiritual. Some few faltering steps have already been taken, but little of real value has been accomplished. Secondly, the prevention of deafness. Or, may I say, the ultimate abolition of the otologist! Our slogan is to be the conservation of hearing. Our aim is to seek the intelligent co-operation of the entire medical profession and of the Health Department of the Public School System of our city.

At the Health Day examinations held in the city schools last fall it was ascertained that one-half of one per cent, or four thousand of the children examined, had defective hearing. So far as our knowledge goes,

little or no provision is made by the schools for these handicapped children. They are allowed to struggle along as best they can until in many cases they are obliged to drop out entirely. We intend to fight for educational opportunities for these young people. We desire to see a clinic established for children of school age. Much attention is given to eyes and teeth. Is it not time that some emphasis be placed on ears? Is it not time to strive for the prevention of deafness?

I have been asked to give a demonstration of the work of the Educational Department, and I find that it is not an easy thing to do. But by way of showing how a young student may be properly guided and instructed in lip reading and also to prove to you just what the splendidly progressive spirit of the coming generation is, I have asked one of our young girls to come here tonight. She is a high school student, seventeen years old, who was obliged to leave school in the second year of work on account of her deafness. She was brought to us originally by a teacher. About a year later she returned alone and made application for a scholarship in lip reading. For two and a half months she has been studying under our department, and she is reported to have made exceptional progress. She now has daily practice in our Practice Department. Through the efforts of the Employment Department she has been placed in the Clara De Hirsh Trade School, where she is studying embroidery and dressmaking. This young girl has succeeded in carrying her point in the face of the opposition of her family, and except for the help that the League is giving her, almost single-handed. She has found the thing that she wants to do and the means for doing it in the face of obstacles that might easily have overpowered her.

I have never taught this young girl and I have spoken to her only a time or so. To show you how well she can read the lips, I shall ask some questions, not using my voice, and tell her a story. You may judge for yourselves whether or not our efforts have been of any avail.

Questions—1. What is your name? 2. Where do you live? 3. How old are you? 4. Where do you go to school? 5. What do you study at school? 6. Do you like the work? 7. Are you warm enough? 8. Are you too warm? 9. Can you swim? 10. Can you float on your back? 11. How long have you been studying lip reading? 12. Has the League been a good friend to you?

These questions were all answered intelligently without being repeated.

The story.—I am going to tell you a story about a man named Tony. He had been in America for about five years, but he was not an American citizen. He decided that he would like to be an American citizen, so he applied to the naturalization board. One day he went before the board for his final papers and the examiner asked him some questions about American history. First he asked:

"Who was the first president?"

"George Washington," answered Tony.

"Who is president at the present time?"

"Mr. Harding."

"That's right," said the examiner. "Tony, would it be possible for any one to be president?"

"Yes, sir."

"Could you be president, Tony?"

"Oh, please excuse me, sir. I am too busy. I could not do that."

Questions on the story.—1. What was the man's name? 2. How long had he been in America? 3. Was he an American citizen? 4. Where did he apply for his citizenship papers? 5. What was the first question the examiner asked him? 6. How did he answer that question? 7. Did Tony know the name of the man who is president now? 8. What is his name? 9. What did the man ask Tony if he could be? 10. Why did Tony say he could not be president?

The seventh question had to be repeated and was not correctly answered. The tenth question was incorrectly answered, showing that the real point of the story was missed. Upon further explanation, the idea was properly understood.

The Work of the Employment Bureau of the N. Y. League for the Hard of Hearing. Estelle E. Samuelson.

As Miss Peck has already stated it is the object of the Employment Bureau to assist the deafened and hard of hearing in the matter of procuring and retaining employment. We mean "bringing the man and the job together." This involves not only ascertaining where there is an opening for a man of our applicant's particular abilities, but the education of the possible employer to the advantages of employing a deafened man and his duty toward the handicapped as well as the preparation of the applicant for the position. The applicant must be educated to the recognition of the value of lip reading, shown where he can obtain training and encouraged to use a hearing device whenever possible. Of the applicants who come to us 50 per cent have never had aural examination; 80 per cent know nothing about lip reading; 40 per cent have never heard of or seen a hearing device; 28 per cent can pursue their original occupation when the contact with the employer is made for them; 35 per cent can pursue some phase or phases of their former occupation after we have helped them in making the selection and placed them; 37 per cent must be induced to prepare for new occupations, placed as apprentices in them or helped to find vocational classes and schools that will admit them. This class largely comprises watchmen, collectors, telephone operators, teachers, salesmen, stenographers and musicians. The greatest difficulties arise in our work with this class, as there are no day vocational schools that admit adults over 21 years of age, or evening ones that admit adults who are not employed in the trade in which they wish to pursue training. As one can readily see, no provisions have been made for the training of the deafened adult. We shall have to combine our efforts before very long to secure legislation that will overcome this flaw. his personal problem were skillfully shown.

ADDRESS BEFORE JOINT MEETING OF NEW YORK LEAGUE FOR HARD OF HEARING
AND OTIOLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE,
APRIL 8, 1921.

The Future Work of the League. John de Raismes Storey.

In considering the future of the League it cannot be overlooked that it is a pioneer in its field and, therefore, we cannot point to any other similar organization and say this is our model, such will we become in due time. Yet, during the course of the League's years of activities as part of its specific achievements, fields of service have been outlined, methods of work have been tested and it has been positively proved that a great need exists which can be filled to a surprising degree.

In the past perhaps most stress has been placed on the charitable side of the League's work. A change of viewpoint has been rife for some time in this respect. Experience has strongly indicated that the League's most fruitful opportunity for the future lies in its assuming the character of a species of co-operative association of the deafened. There will be plenty of opportunity and desire to accomplish work of charity, for many of the deafened are so poor or weak or helpless as to require assistance of a charitable nature. That, however, is becoming only one feature of the work. The master word will be the League expects the deafened to do their duty to themselves.

The great majority of the deafened do not need charity, but rather information of various kinds, alleviation of their social isolation, encouragement in the solution of their various problems by the precept and practice of those who have already attained to a measure of such success and opportunities to improve themselves mentally and spiritually.

Miss Samuelson and Miss Lehman, Placement Secretary, then gave a short skit entitled "A Day in the Employment Bureau." A typical day was presented, beginning with the morning mail. Problems of persons away from any local organization, reports on jobs and calls for deafened workmen were included. Soon the applicants arrived and how he sees

by listening to leaders and representatives of the various professions and phases of modern life. They also require wholesome recreation, re-training for vocations for which the deafened are fitted (and there are many more such than most people realize), assistance in the obtaining of suitable employment and the opportunity to be of use to someone.

In other words, the crying need of the great majority of the deafened is the chance to lead normal, wholesome lives. It is no exaggeration to say that the majority of the deafened do not lead such lives. And we of the League say with deep conviction that nothing is to prevent the deafened from enjoying all the substantial benefits of sound, broad living. We believe we can offer to the deafened of New York the desired opportunity at a minimum cost by having the League do most of the work in the spirit of a co-operative association, wherein each member will both give and receive, obtaining for himself facilities for enjoyment and self-improvement that could not possibly be afforded by a smaller group, and thus grouped, rendering services to his kind of a lasting and signal character. Already, indeed, it can be said that practically all our deafened members who give any time at all to the League get out of it more than they give, and it is this fact that has resulted in the proposed plan to emphasize the co-operative feature.

With any fair part of the many thousands of deafened living in New York City awakened to the benefits of co-operation, it will be possible to apportion the running expenses, the important charitable work and the overhead charges of the League equally among the members at a cost to each member of a very small monthly sum. The generosity of donors will be locked to only for the creation of special funds for special far reaching purposes.

The League can then have its own building with an auditorium, acoustically perfect and scientifically lighted so as not to interfere with the vision and equipped with hearing devices for the purpose of entertaining and instructing the members. Lectures, illustrated and otherwise, addresses, concerts, theatrical performances and other entertainments and educational activities will be enjoyed by the members under conditions which will assure the best results. Rooms will be provided for all the activities of the League. The present work of the League in its various branches will be carried out on a greater scale and new fields developed. The Employment Bureau will operate on the scale justified by its importance. The Vocational Department will be developed to assist the deafened in fitting themselves for employment and thus become economically independent. The interests of the deafened can be served in many ways. The authorities, both state and city, can be prevailed upon to provide deafened children and adults with proper educational and vocational training facilities. Clinics can be organized and conducted in the most scientific and approved manner, especially in connection with the prevention of deafness among school children. The League should be a pioneer in the development of the most scientific medical treatment of the deafened through its Consulting Board of Otologists.

The League would then establish a bureau for the purpose of scientifically investigating, reporting upon and recommending the best artificial hearing devices. The League, undoubtedly, will endeavor to encourage the creation of a foundation for the conducting of original research work in otology. This can be accomplished either directly by League agencies, or through arousing public interest in the subject so that foundations and persons of great wealth will be interested in contributing to such research, with respect to which so little has been done.

In short, the League can become a great clearing house of accurate and helpful information, and of sound activities by and for the interest of the deafened.

While the League will then be a kind of co-operative association of the deafened, it will need many hearing friends and members, especially otologists. It would be an obvious mistake for the deafened to completely segregate themselves. Moreover, you otologists can help us by your ad-

vice, by co-operating with us in developing the activities of the League, by becoming members, by doing propaganda work for us in many ways, making our work better known and thus leading to the increase of our membership, and by enabling the League to achieve its destiny. It has been said that the finest characters known to modern civilization are developed in the medical profession. Surely to such men in view of the frequency with which you have to read to us, not death sentences, but let us say, sentences to penal servitude, it must be an abiding satisfaction to be able to co-operate in the development of an organization which has successfully mitigated that servitude and brought hope and contentment where too often little existed.

Extension of the League's Work Into An American Association for the Hard of Hearing. Dr. Wendell C. Phillips.

I do not need to tell many of you that the speaker who preceded me (Mr. Storey) has overcome his handicap in a most marvelous manner. A college graduate, a lawyer of eminence, and a man of very great educational attainments has just addressed you and has done so in a spirit that shows what it means to persons, like all of those in connection with this work, to overcome such a handicap. You did not hear a single note of sorrow or discouragement, but you read the mind of a man who enlarged upon what has been done.

I am down to speak tonight of the new National organization. As soon as I became convinced that this New York League was to become the great success that it has achieved, I also became convinced that if it was good for New York, it would be good for Chicago and San Francisco, and for other cities where there are deaf persons, and there are few places where there are not some and if all of these organizations could be brought together and form a national organization it would enhance the good work. What I would like to see, and what we have laid the foundation for here, is not only a series of a thousand leagues like this one, but thousands like those which Mr. Storey's imagination pictured to you tonight—he is a proof of it. His prophecy is to come true, and all up and down this country you will live to see the time when there will be leagues like this one, only ten times more useful and beneficial.

Sitting in this room is the President of the Chicago League for the Hard of Hearing. A month ago I accepted an invitation to address that League and I found there the same atmosphere as here; there is one in Toledo, one in San Francisco, etc., etc., and in other cities, and in Washington they have just organized. These leagues and guilds will become most helpful, and through their organization into a national association, with annual scientific programs, will come the opportunity of carrying the cause of social service for the deafened to the ends of the earth. Dr. Chambers of Jersey City, has started a league in his city. They went into it with enthusiasm. I am told that Toledo has an organization of the same type.

This national organization will hold its first annual meeting in Boston in May in connection with the A. M. A. We will have a very fine programme, and there will be one joint session where all the League people will go. Miss Peck is to read one of the papers before the A. M. A. This is what we are trying to do, and I hope to live to see the unusual work you have seen demonstrated here tonight carried out in the national organization.

DR. TALBOT R. CHAMBERS (Jersey City): I feel tonight like the young fellow who was calling on his best girl and had been calling on her so long that she got tired and determined to have him come to the point; so she said to him: "Would you take a kiss for the pink in your button-hole?" He rose to the hook and said "Yes" and gave her the pink, and when she got it he ran from the room for his coat and hat and said: "I am going for a whole load of pinks."

Inspiration has been aroused by every one of your speakers. Every one seems to be enthused with the idea of service—helping the afflicted to

help themselves. I feel like going out and getting a whole load of pinks and am sorry I cannot bring my whole League over here.

I started the J. C. League eight months ago in Jersey City, stimulated by Dr. Phillips, who told the pathetic story of a young girl about to commit suicide. She had lost job after job because of deafness. This was 15 years ago. Today she is a happy useful member of society—all due to influence such as is found in these Leagues.

Our League started out very enthusiastically and hopefully. When we had gotten a certain distance a number of the members fell away, but we instituted the plan of following up and most all have come back.

One Wednesday we had a social with thirty-seven ladies present and several volunteered they had never had such a good time in their lives. The daughter of one of them said: "Mother, you are getting to be a regular sport; you go out now and as for the socials, you never miss one of them."

Mr. C., a candidate for the suicidal club, melancholic and hopeless, had caused constant worry at home. After he had joined the League he went about the home whistling and smiling and earnest and happy. The gloomy home had been transformed.

Our numbers do not increase as fast as they should. Deaf people are so self-conscious and suspicions they do not want to be helped. They do and they don't want to come. A father will bring his child, a wife, her husband, a husband his wife and when the ice is once broken, it is all right, but the difficulty is getting them started. Some will fall away and must be reassured and reinvited or they will relapse into their old lassitude. So, it happens with deaf people someone else must take the initiative, introducing them and inducing them to try our League and here is our great discouragement. We have employed many ways of bringing our League before the public and they are friendly, but seem to have no interest in advising their deaf friends and relatives to join the League. Every week we have two or three names added, but we feel they should be scores. How can we make the public boosters for us? We have many members who are unflagging in their efforts in the club's activities, but their field is limited; however, they help themselves in working for the League, they help others and especially the managers.

The work is a glorious work of service and has a great future. Notwithstanding the advances in otology there will continue to be deaf people. They are preyed upon by the unscrupulous, ignorant and wicked, false advisers. These Leagues have several functions to fulfill and correct advice in treatment is one of them.

I thank you for the privilege of speaking to this splendid audience.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

April 26, 1921.

Case of Carcinoma of the Larynx Removed By Suspension Laryngoscopy, With Subsequent Application of Radium. Dr. Sidney Yankauer.

J. C., male, 53 years old, entered the laryngological service of Mount Sinai Hospital on August 31, 1916, with a history of hoarseness, cough, choking sensation and expectoration of five months duration. These symptoms increased gradually in severity, and for two months there was in addition difficulty in swallowing. He had lost some weight and had become thin and emaciated.

Examination showed a large white mass involving the ary-epiglottic fold in the base of the epiglottis, the false cord on one side obscuring the view of the true cord on that side. There was no glandular involvement.

Microscopic examination of specimen removed showed carcinoma.

On September 8, 1916, the tumor was excised under suspension laryngoscopy, the original Killian apparatus being used, the spatula being intro-

duced between the tongue and epiglottis. The epiglottis was seized with forceps, its frenum cut with scissors; the epiglottis was then dissected from its attachment to the thyroid cartilage with a long handled scalpel, the incision carried out into the pyriform fossa and then across the ary-epiglottic fold near its attachment to the arytenoid cartilage. The removal of the entire mass was then completed with scissors. The bleeding was slight. It was controlled by crushing and twisting a few vessels, and by application of thromboplastin to the wound surface. The edges of the wound were then approximated by means of two catgut sutures, which were put in place by means of the instruments used for intranasal suturing.

On the fourth day after the operation, and again on the eighth day applications of radium were made. A rubber covered brass intubation tube was introduced into the larynx. Inside this tube was suspended a brass container in which the glass capsule of radium was placed. It was left in place for three hours at each sitting.

On the tenth day after operation the wound was apparently healed and the patient was discharged.

I saw the patient again a few months later; there was no recurrence and the wound was healed.

I did not see the patient again until a few months ago, and then learned that during my service with the army abroad the patient again entered the hospital in a state of extreme dyspnoea, so that a tracheotomy had to be performed. The dyspnoea was caused by a stricture of the larynx produced by adhesions between the vocal cords, the cause of which I do not know. There is no recurrence of the growth.

I have made no attempt to dilate this stricture for the purpose of removing the tracheotomy tube for fear of setting up an irritation which might result in a renewal of the growth, but I would be interested to hear the opinion of the members of the section on this point.

Mixed Tumor of the Larynx Removed by Suspension Laryngoscopy, With Subsequent Application of Radium. Dr. Sidney Yankauer.

Male, 42 years old. First seen by me on August 20, 1920. He stated that for one year he had become progressively hoarse, with moderate dyspnoea. No cough or loss of weight. He stated that four months previously a piece of tissue had been removed from his larynx and examined microscopically and pronounced carcinoma. Examination showed a large red nodular mass about the size of a cherry, protruding from the anterior half of the right vocal cord. The mass was removed by indirect method with a snare and sent to the pathologist, who reported that it was a double tumor, part of which was a squamous celled carcinoma, the rest a mixed cell sarcoma.

The patient was sent to the hospital and two intralaryngeal applications of radium were made with the radium intubator. He did not tolerate this instrument very well, so the applications were continued externally, the patient receiving in all about 1000 M.C.H. of radium emanations, screened with brass and rubber.

Under this treatment the tumor did not increase in size, but neither did it disappear, so on December 10, I removed the mass under suspension laryngoscopy. It was easily shelled out, and there was very little bleeding.

There has been no recurrence of the growth up to the present time.

DISCUSSION.

DR. FORBES congratulated Dr. Yankauer on his courage and enthusiasm in removing the larynx, even in part, through the suspension method for the purpose of removing a malignant growth. Although he himself and Dr. Harris had started suspension laryngoscopy at the Post-Graduate Hospital many years ago, he had never had the courage to tackle anything so radical as this. He agreed with Dr. Yankauer that a great deal more work can be done by suspension laryngoscopy and that it should form a part of the armamentarium of every nose and throat operator. There

are not enough men familiar with suspension laryngoscopy, and whether or not you go in with the esophagoscope or bronchoscope, every man should be able to operate and treat ordinary laryngeal conditions by means of suspension laryngoscopy. For all operative work of a minor nature, suspension laryngoscopy, affording the use of both hands, is the ideal method of performing the operation.

DR. T. J. HARRIS said that these two cases were unusually interesting ones, the mixed tumor particularly so. As Dr. Yankauer had stated, such cases are exceedingly rare, and on that account, from the histological and pathological standpoint, it was of especial interest. There were many other points that might be discussed, and perhaps Dr. Yankauer would tell a little more about the method of application and the amount of radium used. With regard to the removal of the malignant growth intralaryngeally, Dr. Yankauer had expressed himself very favorably, although he was careful to state that he resorted to it only because the patient had refused other measures.

DR. HARMON SMITH said that certain men were gifted in technique, patience and persistence, which enabled them to perform these operations with accuracy and skill, while others, not so gifted, were apt to make a bungling job of it. Doctor Lynch, of New Orleans, had reported the favorable removal of malignant growths from the larynx by suspension laryngoscopy, and the time elapsed since the operations had proved them to be a success. Doctor Smith doubted very much whether it was within the province of all laryngologists to even undertake the removal of a malignant growth by means of suspension laryngoscopy; certainly he would not himself feel justified in employing such a method. He then cited an instance where he had by indirect laryngoscopy removed a growth from the larynx of a woman for the purpose of microscopic examination, which under the microscope proved to be malignant. The growth had recurred since that time and had been removed on five successive occasions. This was necessitated by the refusal of the patient to have anything further done, and the necessity for her continuing to maintain a rather large family by her own efforts. The growth had changed its locality, and instead of being upon the center of the cord, as in the beginning, was now in the anterior commissure and below the true cord. Recently Dr. Quick had been applying radium, with the apparent disappearance of the growth. Sir St. Clair Thompson had reported the removal of a growth under similar circumstances and without recurrence over a reasonable length of time.

Dr. Smith said that while Dr. Yankauer and Dr. Lynch possessed the patience, persistence and technique which would possibly justify them in attempting to do this work by suspension laryngoscopy, the majority of specialists were not warranted in such an undertaking.

DR. D. S. DOUGHERTY said he wished to add his testimony to what Dr. Smith and Dr. Harris had said about suspension laryngoscopy. He had himself taken up suspension laryngoscopy very enthusiastically some years ago after seeing a great deal of Dr. Arrowsmith's work. He had been warned by Dr. Arrowsmith to be in readiness at all times while doing suspension work to perform a tracheotomy. In three cases he had attempted to remove a malignant growth with suspension laryngoscopy, after having successfully removed a number of simple growths, and in each instance had to do a hasty tracheotomy. He took exception to the statement that it should be practiced more generally; as Dr. Smith had said, it was only practicable in the hands of those who are more gifted than the majority. Dr. Dougherty said that he had given it up, as he did not wish to do a hasty tracheotomy and see his patient go out.

DR. YANKAUER expressed regret that Dr. Smith should make any exception in his favor, for he was sure that Dr. Smith himself had as much technical skill as any laryngologist. It was only a matter of persistence and patience. He agreed with Dr. Smith, however, that the safest and most sure way of removing a laryngeal carcinoma was by means of external surgery, and he by no means thought that suspension laryn-

goscopy was the method of choice for a growth of that kind. He had had to make such a decision recently, in a case in which the tumor occupied a large part of the vocal cord; it seemed very questionable whether he could get the growth out, and he decided to do the external operation. Whether the majority of men would not be able to use suspension laryngoscopy successfully if they took the time to acquire the necessary skill, he could not say, but he felt that as long as it was possible to do a thing of that kind in the interests of our patients we should try to develop as much skill as necessary in order to save as many patients as possible from the necessity of such a deforming operation as laryngectomy. In both of these cases the patients refused external operation. The first refused even a tracheotomy, and only consented to that a year later when his dyspnoea became extreme owing to the stricture. Both of these operations were done without a tracheotomy, as none was needed; nor had he ever had to do a tracheotomy after a suspension laryngoscopy, although he had performed it for all sorts of purposes; but he had never had to do a tracheotomy because of dyspnoea following the manipulation.

The second case was of interest also because most of the applications of radium were made before the tumor was removed; that was a very valuable method of employing radium, for if the growth is rayed before the surgical intervention the external parts may be destroyed and the tumor more thoroughly delimited. This double tumor was decidedly limited in its outlines, so that it was very easily shelled out, and it seemed probable that the previous radium treatment caused this limitation. Only one or two applications were made afterward. In this case, the emanations were used; in the first case, the radium salt. The second case had 5 intra-laryngeal and 3 external applications, in all about 1000 mc. hours.

Radium in Cancer of the Larynx; With Particular Reference to Dosage and the Dangers of Its Employment. Dr. T. J. Harris.

Published in full in this issue of THE LARYNGOSCOPE.

DISCUSSION.

DR. IMPERATORI requested that in discussing the subject the speakers would stress particularly the dosage and dangers of employment of radium, the application externally and intra-laryngeally, or by the combined method; or by laryngo-fissure; or through a tracheotomy wound, or directly in the tissues by the use of radium emanations; the length of time of the exposures, whether by short massive doses or prolonged small ones, the use of radium emanations, etc., etc. Shall cases be operated on first, and then radium applied, or shall they be radiated first and then operated, and lastly, how long a period must elapse after treatment before a case can be considered as cured.

DR. HARMON SMITH said he hardly felt adequate to express an opinion concerning some of the points mentioned by Dr. Imperatori, for the simple reason that all of his cases had been referred to either Dr. Janeway or Dr. Quick at the Memorial Hospital. The earlier cases were referred to Dr. Janeway some years back, and they all went on to ultimate death. In a majority of them a tracheotomy had been performed and the patients were referred to the hospital for radium treatment because they were inoperable cases; they were extrinsic cases and had been pronounced inoperable by Dr. MacKenty and others.

However, more recently he had referred cancer cases which were inhibited in their progress by the application of radium; this was particularly so in the cases which had been submitted to Dr. Quick since the death of Dr. Janeway. Unquestionably there seems to be a virtue in radium which inhibits or produces a retardation of the progress of the malignancy. How is that done? It produces an endarteritis. The first blood supply of a malignant tumor is of a primitive character, unlike the femoral or radial artery; the intima of the new artery is not the

same as the intima of the artery formed in utero; it may be influenced by either light or heat. Radium, X-ray or any form of heat will obliterate this new artery and thereby shuts off the blood supply to the new growth. The new growth by inanition, by insufficient blood supply, shrinks, contracts, withdraws in itself, is reduced to a smaller compass. Consequently, after the application of radium it is justifiable to operate, for the growth is confined within a circumscribed limit; whereas, if left alone, or if partially removed, in due course of time, nature re-establishes the blood supply on a firmer basis; the blood supply is now of a more definite type, it corresponds more intimately with the blood supply formed by nature in utero, and when the blood supply is re-established it begins to expand and has a nourishment that will sustain it until the ultimate end. Consequently it seems that the best principle is to apply the radium first, let the cell growth shrink to its smallest compass, shut off the primitive blood supply and then operate. But why operate first and then apply radium in the hope of cutting off the blood supply that nature would re-establish?

Dr. Smith said that he was on the fence in regard to radium and did not know whether radium is going to cure cancer or not, but very much doubted whether it would cure the type of cancer with which all are so familiar. There are many types of cancer; the pathologist does not help us. He had seen many cases, not only his own, but others also, where cancer had gone on for years—in one instance for thirteen years—before it went on to operation. Dr. Emil Mayer had recently told him of a case which had gone on for years without operation. In a number of instances it was neither progressive nor aggressive, but was slow in its processes, and an application of radium might produce a favorable result and lead to erroneous conclusions.

Dr. Smith said he had had reason to modify his former pessimistic opinion since he had been sending patients to Dr. Quick. Dr. Quick had applied radium in the case of a woman from whom five years ago he had removed a growth which was found to be malignant. He had seen this case the day before, and while it showed an edematous condition as an evidence of a burn, it was still very favorable. In another case where there was a severe burn he had to puncture to let out the serum so the man could breathe. This condition subsided. We do get relief, but we do get burns from radium, and these cases must be followed up. In one case quite a granuloma formed in the place where the tumor had been, subsequent to the burn of the radium, but finally disappeared. We must look out for these burns.

Dr. Smith said he did not believe in applying radium externally; it must be applied in the larynx or into the tissues. Neither Dr. Janeway nor Dr. Quick would predict that radium would cure cancer; we cannot determine that as yet; but it does relieve pain, it reduces the discharge, and it temporarily reduces the progress of the disease and gives hope to the patient. He then told of two cases that had been treated by Dr. Quick. One patient was from South America and the other one from one of the British West Indies. Both had been relieved by the application of radium, but there would probably be a recurrence, and whether the patients could then be relieved surgically, or whether it would have been wiser to have applied the radium and then removed the growth, was a question still in doubt.

There is an opinion prevalent among the laity that radium will cure cancer. Both of these patients demanded to have radium applied; both Dr. Coakley and Dr. MacKenty advised operation, but the patients refused. Unless this belief in the efficacy of radium is dispelled we will have trouble. The people have imbibed the idea that radium will cure cancer, and they demand it and will have it. We must come to something definite and establish an opinion beyond question in the matter.

DR. YANKAUER said he had little to add to what had already been said, and could only report in addition to the two cases just shown, that in one case he did a laryngo-fissure for the removal of a carcinoma of the

cord, and applied radium screened with brass and rubber for 10 hours. The radium, within a small container, was introduced into the larynx. The operation was followed by a very severe slough which took a week to disappear, but the patient made a good recovery.

He was inclined to endorse the opinion expressed by Dr. Smith that at the present time it is probably the safest method to apply radium before operating and so limit the extent of the growth and then remove it surgically.

He has used radium both externally and by the internal method. The effect of the rays is more pronounced if applied from two or three different angles at the same time, so that a cross-fire effect is obtained. That method had been followed in one of the cases reported. It had also been followed in a case of cancer of the lung, the radium being applied externally on the chest and within the bronchus. Further, he said that the method he has used for applying radium to the interior consists of introducing into the larynx a large brass tube containing a smaller one in which the radium or radium emanations are contained, the patient breaking through the apparatus. With this method he had been able to leave the radium in place for two, three or four hours at a time. The larynx is cocainized and the patients seem to tolerate it very well. In making such an application the entire larynx is exposed to the action of radium, not only the diseased but also the healthy side. In the first case he had presented he had thought that perhaps the stricture may have been caused by the radium application, although it did not occur until a year later. When radium is applied to the interior by means of a needle, you get the effect of the radium from all sides of the needle and not, as in the intubation method, from one-half of the radium. With the needle you get all the rays into the growth, and there ought to be no difficulty in introducing the needles in a laryngeal growth, though personally he had had no experience with the needle.

DR. FORBES said that he and Dr. Harris had started with the use of radium some ten or twelve years ago in treating papilloma of the larynx, making short exposures and not using a very large quantity of radium, but they never had had a burn. Following along that line, when he returned from France in 1919 and found that radium was being used so extensively for malignant growths, he used it on a case of carcinoma of the left cord, using the method employed by himself and Dr. Harris at that time screening half of the radium so that the emanations acted only on that half of the larynx where it was needed. Three weeks following the first application, another application was made, and at that time the growth was removed. It was reported to be a malignant epithelioma of the cord. Other applications of radium were made, and then within a month or six weeks half of the larynx was removed. Sections were made in all directions from tissue taken from that half of the larynx, but no evidence of malignancy was found. That was nearly two years ago, and there has been no evidence of any recurrence of the malignancy. The patient was seen recently and a cord had developed, a sort of band, and he is able to talk well. That was only one case. Dr. Forbes said that since then he had not had the fortune to see another operable case. All the cases that had come to the Post-Graduate Hospital, some 25 or so, had been non-operable when admitted.

Following the method first used, capsules properly screened were held in the larynx for a time. That method was discarded a year and a half ago. Under Dr. Willis' direction, the radium salt has been used either in form of needle or in capsule; these have been placed in position, using direct laryngoscopy or esophagoscopy, earlier the suspension method. The larynx is exposed perfectly and the radium placed in position, directly and accurately. We felt this to be the most scientific method to use and gave us opportunity to note the conditions from time to time.

In reference to the cross-fire and external method of using radium, Dr. Forbes said they were dealing entirely with the salt, i. e., with the radium itself, since they had no method of getting the emanations, which

are rather expensive and require an expert chemist for their preparation; but he believes that Dr. Willis has been able to get most satisfactory results by marking off certain areas and using certain angulations to get the rays on the growth.

From what he had seen, Dr. Forbes said he was rather on the fence in regard to radium, but still enthusiastic. On the other hand, the cases treated with both radium and operation were all following along the lines described by Dr. Smith. He had found that an early tracheotomy was much more comfortable to the patient than a later or an emergency tracheotomy. In only one or two cases, such as Dr. Yankauer referred to, had it been necessary to do an emergency tracheotomy. One man refused to permit a tracheotomy. So far as burns were concerned, with the use of the needle, he had not seen any, though he understood there had been one some years ago, but there had been a number of abscesses. These, Dr. Willis thought were due to direct infection following the applications, though aseptic precautions had been observed. Whether that might be called a burn followed by breaking down, or whether it was a septic condition, Dr. Forbes said he did not know, but the cases behaved like a breaking down with pus formation, and they were quite distressing.

Of 25 cases treated so far, there were no cures reported, but decided improvement in many and the time had only been $1\frac{1}{2}$ years, but according to the radium classification, they were grouped as almost on the border line of not using radium at all, so they had not presented a fair test, and Dr. Willis felt that with the number of other cases requiring treatment which promised success, it was not fair to use the radium on hopeless cases. In no cases of that type had they been successful.

Replying to a query, Dr. Forbes said they were employing radium salt, using 10 to 20 mg. in each needle, and applying the 10 mg. once in four weeks. They started by using one needle for three hours, but had recently been using 2 needles, placing them 1 cm. apart. They had not been fortunate in getting early or border line cases, the kind they are apparently getting at the Memorial Hospital.

Replying to a query as to the method of application in the 25 cases referred to, Dr. Forbes said that they had all had an average of six treatments at an interval of a month apart; some of them were more or less relieved, some had been lost track of, and some had died. The general plan of procedure was to use the radium once in four weeks; the physiological action of the radium seemed to reach its maximum at the end of three weeks and the normal cells which have had a certain amount of stimulation can receive a second application without danger at the end of four weeks. All cases have received the local and, where possible, the additional so-called "cross-fire."

DR. QUICK apologized for not having been able to complete some work which should have been done. He had been going over the statistics of all the work at the Memorial Hospital for the purpose of publishing a radium report covering the last three years, and the larynx group had not been completed. They had, however, treated over 100 cases of laryngeal cancer. Many of them would have been better not treated. He said he would not speak at all of cures; that was a term that laryngeal surgeons, radium workers and surgeons in general should avoid in speaking of malignant lesions. Several of the cases treated were apparently free from disease at the present time, the longest case being nearly three years free following treatment, and seven or eight others for shorter periods ranging from less than a year to a year and a half or more. It was impossible to give accurate figures just now, but these cases were apparently free from disease at the present time.

In dealing with this group of cases a good deal of information had been gained. In looking over the records it was interesting to see the manner in which the technique had changed, and that with these changes better results were being obtained. Dr. Smith had referred to Boggs'

attributing a great deal of the failure to incompetent therapy. We are all rather incompetent yet, some being worse than others.

If we are going to treat these cases, we should have some definite plan and ideas when we start. First, the cases should be classified, and upon the basis of that classification the treatment should be pursued. There are two or three different methods of classification: first, whether operable or non-operable. Referring to the operable group, Dr. Quick said he hoped before the meeting was over some of the men who see these cases in the laryngeal clinics would tell what percentage were operable as they see them. At the Memorial Hospital they got mostly very advanced cases. Very seldom a case that is operable comes along, and then they get very enthusiastic about it.

In those that belong to the strictly operable group, what should be done? Use radium or surgery, or a combination? About that, he could simply state his opinion. Earlier in the meeting, Dr. Smith had spoken of the dexterity of men like Dr. Yankauer and Dr. Lynch in using suspension laryngoscopy. A few men like Dr. MacKenty could be put in a similar group in regard to doing laryngectomy, but the majority of the surgeons do not fall in that classification in doing that operation. While surgery may completely remove a local disease, still very frequently it does not do so. Not long ago a man was seen who had been operated upon, and the disease found to be more widespread than had been thought. Dr. Quick said that personally he felt that the palpation of malignant growths was more important than seeing them, and since this was impossible in the larynx, it frequently happened that a correct estimate of the extent of disease could not be made.

From the standpoint of radium, he said that he felt that if so much can be accomplished by radium in a bad case, it was only reasonable to believe that more could be accomplished with a less advanced case. While they could not as yet report absolute cures, yet with the improved and improving technique those at the Memorial Hospital feel that radium can claim a recognized position in dealing with operable growths. He would not press the point, but that was the feeling. If, however, a man was not willing to accept that, he felt that it was almost inexcusable to do a laryngectomy or removal of any sort without radiating first. We know the effect that radium has on malignant growths in this location, and if pre-operative radiation is employed in other parts of the body, it should be just as effective in the throat as elsewhere. Personally he believed that radium should be used first, before surgery, if a surgical removal must be part of the treatment.

As for radium after surgery, the application to the direct site might be of some good, but he could not feel that it was an accurate method. Any radium used afterward must be a gunshot procedure.

What is to be done for the large group of inoperable cases? These again may be divided. A certain number may be placed in the group where there can be hope for a complete regression. In a certain number, it may be possible to cause complete regression of the growth, for how long, we do not know. In others considerable relief can be given, bleeding checked, pain lessened and length of life increased. Another group, however, should be let alone entirely. If a patient has his throat filled up with a growth and you use radium on it, you will probably close his throat and have to do a hurried tracheotomy, all to no avail.

Then these cases may be classified as intrinsic and extrinsic. That has much bearing as to how to apply the radium, and whether or not you have a fair chance for hoping for a regression, or whether you are treating from a purely palliative standpoint. All of these should be considered from the start.

If we are going to treat with any hope of complete regression, we should go at it as strenuously as possible, and possibly have to make some sacrifices of the patient's comfort, whereas if you are treating from a purely palliative standpoint you want to consider the patient's comfort all the way through.

As to the method of treatment, external radiation should be used on every case, whether intrinsic or extrinsic. Dr. Quick stated that he had never seen but one case of malignant disease of the larynx which had regressed entirely from external radiation. That was a very cellular tumor which belonged to the group of lymphosarcoma. It will add very materially to the radiation to apply it externally, but coupled with that it must be used internally in some form. If the lesion is extrinsic, there the emanations should be buried. The plan has been to bury the emanations throughout the growth and not to attempt to apply filtrated radium, using cross-fire radium externally and burying the radium internally. For the intrinsic lesions it was only occasionally that buried emanation could be employed and then in very weak tubes. In such cases one is dealing with a delicate structure and in limited space, and filtered radium is the agent of choice.

The question of tracheotomy should be determined by the individual case. Some persons with plenty of breathing space can stand tubes down between the cords without serious inconvenience; others cannot, and in such cases where we hope for some real benefit from the treatment, we are justified in doing a tracheotomy. But from the palliative standpoint we should not subject the patient to a tracheotomy when we can hope to do very little for him anyhow, except as an emergency procedure.

Recently another scheme has been devised for getting radium down into the larynx, which is especially applicable about the cords, where there is a unilateral lesion and the object is to avoid injuring the opposite cord. In a case of papilloma of the larynx seen some four or five years ago, radium was put between the cords, and it disappeared very readily, but several months later the patient had such a severe stenosis that a tracheotomy had to be performed. Later the glottis was stretched and tracheotomy closed. She now breathes and speaks fairly well. That was one instance of the danger of radiating the entire larynx too heavily. To prevent that, a funnel-like apparatus has been constructed, representing a very small bulb of radium emanations, 500-600 mc. unfiltered, in a steel protecting cone, on a long wire for further protection. By cocainizing the larynx and bending the wire, it reaches the lesion and in a very few minutes with 500-600 mg. you can give a very strong dose, and while the opposite side gets an appreciable amount, it does not get sufficient to cause a sclerosis. That method has been found very useful.

As to the dosage. All have read reports in the literature dealing with cases treated by radium, which have mentioned a tube of certain strength, and sometimes giving neither the strength of the tube nor the time of exposure, etc., etc., and therefore it is called a radium failure. We should not blame the radium too much, but should take some of the blame to ourselves, when we were not hitting the thing on the head. The accuracy and intimacy of the approximation of the radium to the growth are all-important factors; get it properly applied, in proper dosage, as close as possible, and you will get results. Then you should give the maximum dosage that that particular filtration distance, etc., etc., will permit. Dr. Quick said he was opposed to fractional dosage for the reason that a certain amount of fibrosis is caused by the radium, and by using repeated small doses there is more and more fibrosis so that the remaining malignant cells become protected by this scar tissue and efficient treatment is thereby rendered more difficult. If you are able to shut it off by a good stiff dosage, it is much better.

Dr. Quick said that for the external radiation applied through the neck, they are at the present time applying it at two angles directly at cross-fire through the larynx, and occasionally give a third dose from the front.

Filtration aims at getting rid of all but the harder radiation. Some time ago a filtration of 2 mm. of lead was used. Now 2 mm. brass filtration is used, and with that they will stand 2200 to 2500 mc. at a distance of 3 cm. from the neck, etc. That method is the stock procedure at the Memorial Hospital for external radiation. For internal radiation, where

the aim is to get nothing but the gamma rays, platinum has proved to be the most successful filter, $\frac{1}{2}$ mm. of platinum permits the use of a very small tube and occupies very little space. As a rule, two of these tubes are used tandem fashion, so as to get further down. The radium should be put well down.

In regard to the use of buried emanations, in the early work, tubes of 2 or 3 mc. strength were used. Emanations decrease in value at the rate of 15 per cent per day, so that a tube can remain in place until it is used up. Calculated out at a rate of a loss of 15 per cent per day, it will be found that 1 mc. is equal to 132 mc. hours of continuous radiation, so that using 2 and 3 mc. tubes a very stiff dosage was being used. That was too much, and with it devitalization of the tissues, infection, etc., resulted. Dr. Quick said he was not sure of it, but he thought it probable that the case which Dr. MacKenty had shown, where he removed the larynx, was one of the earlier cases treated with this heavy dosage. Recently they were using tubes of only 1 mc. or less, and aiming to get them distributed through evenly, at about one tube per each cc. of tissue. The patients stand that very well for the most part.

The extension to the nodes of the neck is treated as they do all other intra-oral carcinoma; if they are operable they are treated by external radiation, surgical dissection, radium in the wound, and afterward more external radiation.

As to the dangers, Dr. Quick said he thought there were no dangers so great as the disease itself, within limits; but there were certain dangers that must be watched, burning, sloughing and edema, for all get them at times. Dr. Smith had told of two cases in which he saw edema following radiation, and these were not the only ones; others had occurred. The case which he spoke of puncturing in order to let out the fluid was about as bad a case as they had had. These are real dangers that have to be watched for, and in certain cases a tracheotomy was indicated. Burns, unless they are entirely beyond reason, heal up fairly readily, and now these cases can be treated with a reasonable amount of burning; in order to get a stiff dosage it may be necessary to push it to point of burning, but these are the things we are bound to get.

Dr. M. J. SITTENFIELD said that he had been very much interested in this plan of getting together to standardize the dose of radium, in order to establish, so to speak, a common language, but evidently we are far from the ideal of knowing what the correct dosage should be. For instance, in the Mayo Clinic an erythema dose is considered to be the equivalent of 1000 mg. hours of radium to square inch of skin surface, at a focal distance of 1 inch from the skin, and filtered through 0.5 mm. of silver or 2 mm. of lead. In Germany, on the other hand, it has been determined by the ablest physicists that 2100 mg. hours, or in other words, 30 mg applied 1 and $\frac{1}{2}$ cm. from the skin with a brass filter of 1 and $\frac{1}{2}$ mm. for 70 hours, constitutes a skin erythema dose.

Furthermore, it has been established that 85 per cent of a skin erythema dose will kill the cancer cell. The problem that now presses is how to administer 85 per cent of a skin erythema dose to a cancer cell in the deeper tissues. In the first place the distance of the cancer from the skin must be determined, and on that knowledge mathematical calculations made of how to reach the cancer cells with a sufficiently large dose to knock out completely the entire tumor mass. This is attempted, if possible, in one sitting. It has been shown that one large dose at one sitting is more effective in destroying the cancer cells than repeated small doses, with less constitutional reaction upon the part of the patient.

Dr. Sittenfield said further that the method he has employed since he returned from abroad has been one large dose of radium administered from the outside. After all, it makes very little difference whether one uses needles or emanations, as long as the complete tumor mass is knocked out by the radiation. The objection to radium needles is that their sphere of activity is about one-fifth of an inch from the source;

moreover, the tissue nearest the tube receives the greatest amount of radiation, and that farther away only a negligible amount. Consequently an uneven radiation results, whilst the ideal therapy strives for an even and homogenous radiation, so that the entire tumor mass may be completely knocked out. This can be best accomplished by a massive dose applied externally, from both sides if necessary. If the dose has not been sufficient to reach all the cancerous tissue, it may be supplemented by an additional dose antero-posteriorly.

Dr. Sittenfield said that he would not go into the details of classifying the different types of cancer, as that would lead away from the question at hand. There should be no discussion as to the proper method of procedure in a case of cancer; first, pre-operative raying, then in two weeks, at which time the maximum effect of the ray has been obtained, surgical intervention, followed, as soon as the patient has recovered from the operation, by post-operative raying. It is most important that all parts of the cancer be knocked out to get the desired effect. If this is not accomplished, you are bound to have a recurrence. In order to obtain a large enough dose in the deeper tissues to knock out a cancer mass, it is necessary to use much heavier filtration than has been customary heretofore, and at a greater distance from the skin surface. Screening with heavier filters at an increased focal distance entails a greater amount of radium and a longer exposure. Whether brass or lead or platinum, or any other metal should be employed as screens, must be determined by the man who is using the radium. With proper technique, burns ought to be reduced to a minimum.

He then cited cases where the patient had been told to hold the radium to his neck with his unprotected hand, with the result of sloughing and loss of the fingers.

DR. DELAVAN said that the experience gained at the Memorial Hospital and by observers in general connected with other institutions where radium is being used had seemed to prove that the less malignant the character the better the prospects of a cure by the application of radium. Large numbers of cases of laryngeal carcinoma had been treated, in many instances with distinct temporary benefit, but it had been the experience of all observers that the treatment of the more virulent types had given the least satisfactory results.

He then called attention to the expected visit of Madame Curie to this country, and said that we owe to Madame Curie most that is known about radium, but that she has not discovered all that she desires to know about it. She is one of the Professors of the University of Paris, and there the radium which they have is owned by the government and is used exclusively for therapeutic purposes. Madame Curie is not allowed to experiment with it. The wish of her life is to do experimental work. The sum of \$100,000 with which a gram of radium is to be purchased and presented to her has been raised. With the receipt of that gift it is hoped she will be able to advance the knowledge already gained, and with that advance that new and better things will come.

DR. C. EVERETT FIELD, Radium Institute, started by referring to the importance of the present lack of information relative to radium dosage: "Censure should long ago have been passed on much of the literature reported wherein amounts of radium and the screen used was wanting. During the past year or two, very creditable work on standardization of dosage has been announced. The English and Germans have so far been our dependence, particularly the complete reports emanating from the Radium Institutes of London and Manchester. We must understand that radium has gained liberal acceptance by the profession and laity in England and Continental Europe for nearly ten years, whereas little serious work was done in the United States until five years ago.

Radium dosage, as worked out, should cover the type of mass, its density and vascular classification plus radium screened with metals, rubber or distance, and the period of application. Beyond this, data should be reported showing the physical condition of the patient, par-

ticularly relating to elimination and metabolism. Many patients are over-treated with radium and toxic conditions are hastened. There are some cases that present themselves in so poor a physical condition that we feel it unwise to begin radium therapy until their metabolic function is in a measure improved. Until we co-ordinate all measures of treatment indicated, we cannot expect to get the best results from radium. We frequently warn against certain stages where surgical procedure or anesthesia will break the patient's resistance, thereby favoring metastatic advance. Radium overworked can create similar conditions.

Radium, in attacking cancer of the mouth or larynx, should be given with two ideas in mind: first, to give the initial dose with the hope of destroying the cancer nodule; and second, to make application that may block lymphatic channels, thereby checking metastatic advance. A malignancy affecting the tonsil is prone to spread rapidly to the glands of the neck, therefore, those chains of lymphatics should receive heavy radiation. Surgical treatment of cancer without pre-operative radiation with X-ray or radium, I feel will soon be classed as malpractice.

Cancer of the larynx shows discouraging returns with radium as with the knife. I have been able to check up 88 cases treated at the London Institute, Manchester Radium Institute and at Middlesex, with no cures reported by radium. Memorial Hospital in New York reports no cures. At the Radium Institute, we have treated 28 cases with no cases we can call cures, although I believe during the last 18 months our results with radium needles buried in the tumors of the true and false vocal cords are very encouraging. We have nine cases holding well over a year.

I am glad to present for your interest six of the latest type needles such as we now advocate. They average 7½ to 10 milligrams of radium element, 98 per cent pure, in each, and are as fine as an ordinary surgical needle. These are made of platinum alloy and are worked up in very strong walls although as thin as a sheet of paper. Such needles are allowed to remain in tumor mass of the larynx from three to five hours. With a long-handled alligator forcep, working through a straight laryngoscope, the needles can be forced into cancer tissue. By such treatment we secure the maximum of intensity of the rays, and I believe they are equal in influence when compared with buried emanation seeds.

Aside from needle application, we can at times still find advantages in dropping a capsule screened properly into the larynx, which has been cocainized; or where intubation has been required, we may draw a radium tube up through such an opening. Where large amounts of radium are at command we will still advocate cross-fire treatment through the neck as an effective measure.

Dr. HARRIS in closing, said that he had never listened to a more intelligent or a more eloquent discussion. All the men who had spoken had done so in such a reasonable and eloquent manner that those who listened were able to gain many ideas from what had been said. All have the feeling that while there is still a great deal to learn, we are learning all the time.

Dr. FRANK C. MILLER asked whether a standard could be given by any of the methods spoken of as to when a case could be considered a cure.

Dr. IMPERATORI replied that none of the men had reported a cure. Those who had reported cases were very guarded in stating that the condition was arrested.

Dr. HARRIS said that the case that was to have been reported by Dr. Coakley was a cure at autopsy five years afterward, as nothing was found of a cancerous nature.

Dr. COAKLEY said that the case he reported was a cure at autopsy, but that he had not had the opportunity of examining the patient at autopsy. He had been told that the tumor had been removed and that the patient had been well for five years. He had no knowledge of the condition of the patient at autopsy.

SECTION ON OTOLGY.

May 13, 1921.

Influenza Mastoiditis. Dr. J. Morrisett Smith.

Male, age 24, family and past history negative, was admitted to the New York Eye and Ear Infirmary in December, 1920, with an acute mastoiditis on the right side of twelve days' duration, following influenza. There was a profuse discharge from the canal, post-auricular tenderness, sagging canal, and temperature. The general appearance was that of a marked sepsis. A simple mastoid operation disclosed a rather small mastoid filled with free pus. The antrum seemed unusually deep. The cells were thoroughly removed, but there was no exposure of the sinus or dura. The wound was partially closed and packed with iodoform gauze. A smear from the mastoid showed streptococcus.

The patient made normal progress until the sixth day, when he complained of poor vision, and examination of the eye grounds showed beginning choked disc in both eyes. The vision rapidly decreased until three days later there was no light perception in the right eye and only hand movements in the left. There was no nausea, vomiting, headache or nystagmus, and no labyrinthine symptoms. The physical examination was negative. The examination by a consulting neurologist was negative; the urine and blood pressure were normal; temperature, 99.5°; pulse, about 80; Leucocyte count, 16,000 whites; red count, normal. X-ray examination of head and nasal accessory sinuses, was negative. Examination of the nose showed no evidence of infection. Serum and spinal Wassermann tests were negative. The cell count of the spinal fluid showed 30 cells per cmm.

One week after the onset of choked disc, a sub-temporal decompression was done, with little evidence of intra-cranial pressure, and aspiration with a sterile needle in the temperosphenoidal area showed nothing. Two weeks later a partial paralysis of the right arm and leg developed. This gradually improved until the patient regained complete use of both. The choked disc was followed by optic atrophy of both eyes, with vision of 10/200.

The case was peculiarly marked by the absence of any diagnostic symptoms, and the writer is unable to account for the conditions unless there was present a localized intracranial infection, either meningitis or encephalitis.

DISCUSSION.

DR. HERZIG inquired concerning the time that elapsed from the time of the operation to the development of the optic atrophy, and also whether any fields were taken; and whether there were any muscular paralysis or deviations of the eye, such as seen in encephalitis lethargica. Also if there was loss of accommodation.

DR. J. MORRISSETT SMITH replied that there was no paralysis of the muscles. The optic atrophy came on quite some time later but he did not recall the exact time. The patient was in the hospital six weeks and was then transferred to a general hospital, and was then sent to Blackwell's Island for several months.

DR. HUBBY said that it was very important to be on the lookout for such cases just now, as encephalitis was becoming more and more common here. If not on guard, one might operate on a mastoid when a more conservative course was indicated. Recently he had operated on a female child, age 12, with a mastoiditis, who must have been in the early stages of an encephalitis. The X-ray and all the usual symptoms indicated a fairly severe mastoiditis, but on opening the mastoid prac-

tically nothing was found macroscopically. She did not improve, although the wound was healing normally.

Eight days after the operation, symptoms of meningeal irritation developed. She had a moderately stiff neck, slight Kernig both sides and an alternating Babinski. Spinal puncture revealed a clear fluid under slightly increased pressure, 20 cells count, Negouchi slightly positive and Hehling reduced. The rectal temperature was around 99° F. during the last five days of her illness. She died ten days after the mastoidectomy and two days after the symptoms of meningeal irritation. No autopsy was permitted.

DR. J. MORRISSETT SMITH said that in reporting the case he used the term employed for want of anything better. The patient had no symptoms of a true encephalitis, but evidently there was some infection present in the brain which caused the double choked disc. It may have been a localized meningitis, but it did not give the symptoms of that condition.

A New Method of Measuring the Hearing Power. Dr. John Guttman.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. DENCH said that he had been much interested in the paper and demonstration, and that Dr. Guttman was certainly working in the right direction. Naturally, much was still to be desired in the present instrument, but anyone who would take the trouble to work along the lines pointed out and perform the experiments that so few had the ambition to do deserved a great deal of credit, and work of this kind would be a great benefit to men practicing otology.

DR. KAHN said that he had tried to understand the mechanical part, but it was rather complicated to follow from the reading of the paper. Dr. Dench, however, had sounded the keynote in saying that such work should be commended and encouraged. Dr. Guttman had made a wonderful effort to perfect a system for measuring the full and complete tones. The tremendous advantage of such an outfit was readily apparent: one could readily cover the complete range of the tuning fork and eliminate any islands in the organs of hearing. While the phonograph part was admittedly unsatisfactorily as yet, the other part of the apparatus showed wonderful possibilities.

DR. GUTTMAN said that he was not sure that he had made himself fully understood. While with the tuning fork you can determine the pitch, there is no exact method of finding the intensity, while with this apparatus one could read off in a second the intensity of each pitch.

Meningitis. Dr. McCuen Smith.

(To be published in a subsequent issue of THE LARYNGOSCOPE.)

DISCUSSION.

DR. DENCH said that Dr. Smith had covered the subject so thoroughly and had so perfectly stated his own views that there was little to add, but that a great many points had been brought up that would well bear emphasis. In the first statement Dr. Smith emphasized the importance of clearing up the primary focus. That was most important. He did not himself believe that these cases are necessarily fatal, but Dr. Smith undoubtedly struck the keynote in saying that the first thing is to clear up the primary focus of infection.

He was also pleased to hear Dr. Smith say that a serous meningitis is the first stage of a purulent meningitis,—though it reminded him of what Dr. Delafield used to say: If the patient died it was purulent meningitis; but if it cleared up it was not. When there is increased pressure of the spinal fluid and evidence of serous meningitis, it is most important to regard it as the first stage of a purulent meningitis and to clear out the primary focus; that will keep many cases in the serous stage until they go on to recovery.

With reference to the appearance of micro-organisms in the spinal fluid in the last stage, he cited a case of mastoiditis seen some years ago in which he operated and got a perfect result. The wound was almost healed, when some three weeks after the operation the patient developed rigidity and headache, and streptococcus capoulatus was found in the spinal fluid. A modified decompression operation was done, but the dura was not divided. Dr. Eagleton would doubtless agree that some decompression was obtained, even when the dura was not divided. After that, the patient was kept alive for several weeks by repeated lumbar puncture. That perhaps was not a very great achievement, but it was an indication in the right direction. By relieving the pressure one can prolong life, and if that can be continued long enough the patient will be cured. By the decompression and repeated lumbar puncture this patient's life was prolonged.

Referring to Dr. Smith's remarks about diplopia, Dr. Dench did not altogether agree with what had been said. Many cases will give a paralysis of the sixth nerve with diplopia, yet these cases will clear up after a mastoid or other operation which frees the sixth nerve. It was a very common symptom, but not pathognomonic of meningitis.

He had also been interested in what Dr. Smith said about cases of latent meningitis which run a low temperature and the diagnosis is not made until too late. Many of these cases have remissions. In one instance a little patient the temperature had dropped to normal, and the patient played with his toys. The prolongation of life was due to a large exposure of the dura. So while most of these cases die, the results obtained now as compared with those obtained twenty years ago are very much better. The patients live longer, and we have reason to believe that we shall ultimately find a procedure which will cure a certain proportion of them.

Dr. Dench said he had both spoken and written about concomitant meningitis, and that he thought some of the cases to which Dr. Smith had referred were concomitant with and not secondary to the ear infection. The fourth case referred to in which the otitis media came on suddenly and the next day pneumococcus micro-organisms were found in the spinal fluid, was a concomitant and not a secondary; meningitis in many of these types we are dealing with a meningitis where the infection occurs at the same time with the ear infection, and not following it. These cases should not be classed together. When there is a short history and the meningeal symptoms occur shortly after, it is not fair to class the cases as otitic; the one condition accompanies the other, and one should be very careful in differentiating such cases.

Dr. Dench also emphasizes the importance of lumbar puncture as a therapeutic measure in these cases. In many of his own cases life had been prolonged and in some instances preserved by repeated lumbar puncture. Most of these patients die from increased intracranial pressure, and if that can be relieved for a sufficient length of time to establish a balance the patient will get well. Lumbar puncture does that very well and in conjunction with a decompression operation will save a certain number of cases.

With the use of drugs, sera, vaccines, etc., he had not had much success, although others had reported success with these measures, both in the cord and internally. He was himself rather partial to the use of urotropin internally, and it may have some benefit, but he had never had any good effect from it in the cord.

In his experience, stiffness of the neck was one of the early symptoms. If in a child he finds that the head does not flex on the chest and the child has a temperature, he feels strongly inclined to believe that that child has meningitis. He was surprised to hear that Dr. Smith regarded it as a late symptom. He had himself always considered it an early symptom of meningitis.

The main emphasis, however, was to be placed on the first fact to which Dr. Smith had directed attention,—the clearing out of the primary focus of the disease, then the exposure of a very large area of the dura in the middle cranial fossa, cerebellar fossa, and in certain cases the incision of the dura so as to do a subtemporal or subtentorial decompression. At St. Luke's they had had a number of these cases. One of these came in with an acute mastoiditis, a cell count of 22,000 and pneumococci in the spinal cord. Dr. Bowers operated and exposed a large area of dura in the subtemporal region, expecting to divide the dura the next day. The pneumococci disappeared, and the patient made a complete recovery. In another case, the speaker did a double subtemporal and a double subtentorial decompression; that was a case of serous meningitis which made a complete recovery. These were simply two of the cases that could be cited off hand. Dr. Dench said he could recall perhaps ten cases in his own experience which had recovered. One of these in particular was a man suffering from suspected brain abscess, seen long before anything was known about lumbar puncture. The subdural space was drained in the rough way, and the man was living ten years later. He had an acute meningitis, but fortunately he was cured. Crockett had reported a number of cases. He had himself treated a number of cases by ventricular drainage, but had never had any success with that method.

Dr. Dench closed by expressing his belief that by a proper combination of these various methods more will be accomplished in the next ten or twelve years than in the past twenty or twenty-five years.

DR. EAGLETON said he had been gratified to receive the invitation to discuss Dr. Smith's paper for he had certain definite ideas in regard to meningitis, though they had undergone a radical change within the past eighteen months. First, he disagreed with Dr. Smith in that he did not believe that all cases of serous meningitis were the beginning of purulent meningitis. A large number of such cases are of a putrefactive type and should be called putrefactive meningitis. In cases giving a latent focus of infection in the ear adjacent to the dura, nature attempts to throw off a serous fluid with the object of protecting the pia arachnoid from the toxic process. These cases are not infective in the sense that there are no microcosms. If you do puncture and have a cell count, it may become infective and you will have a suppurative meningitis or, what is very common in a pia arachnoid. a true brain abscess, and yet outside of the brain itself. This type of meningitis should be called a protective meningitis for it is nature's effort to protect the meningeal spaces. It is really of toxic origin. These cases will produce all sorts of symptoms,—edema, headache, delirium, and intense pain, and if properly and early treated at the point of infection in the ear by an incision so as to evacuate the infection they will result in a large proportion of cures.

Dr. Eagleton said he had under observation in the Infirmary a boy who had a cell count of 600 in the spinal fluid, yet that boy was now perfectly well. His last lumbar puncture showed a cell count of 600, but he was soon going home without any further surgical procedure. His contention was that these cases have a protective process, and if that is not broken down by surgical measures the patient will probably get well. In his experience examination had often showed that a great deal of surgical damage was done by breaking down the adhesions that were formed as a protective meningitis, and so lighting up a general suppurative meningitis. Examination of the records will show that a large number of cases have immediately followed an operation. These cases of protective meningitis need very little surgical procedure except the removal of the point of infection, and at that time this can usually be accomplished by incision and very careful asepsis.

(To be continued.)

